UNIVERSITETI I EVROPËS JUGLINDORE
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Sections of the article should follow this order: Cover page, Abstract, Body & References.

All submissions will be requested via an open Call for Papers. The Call may be completely open or based on a specific theme, based on the decision of the Editor-In-Chief of the SEEU Review. To assure the highest standards for the publication, all manuscript submissions will be refereed through a peer review process. Additionally, all manuscripts will be subject to review for plagiarism. The preferred language for manuscripts is English, but submissions in Albanian and Macedonian may be considered under specific requests.

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Manuscripts/research papers should be submitted to the Editor via review@seeu.edu.mk

Contents

Foreword • Hyrje • Предговор

Welcome to the fifth issue of the SEEU Review. We have devoted this issue to the critically important subject of the protection of the environment and related areas in the scientific field, ranging from waste disposal in Tetovo and the presence of aluminium in water sources, to emergency procedures in nuclear facilities. According to some work reported here, interest in preserving the environment, flora and fauna of the local area is obviously high among both school and university students but it seems that communicating what is being done through the educative process leaves much to be desired. The fact that SEEU has practised environmental management of its water and waste disposal systems since 2001, and has significantly reduced its electricity consumption through careful management, yet again a model for the region, but not widely known, illustrate this.

We welcome the academic collaboration with staff of the State University of Tetovo and the University of Prishtina and papers from a range of other contributors. We have encouraged students on our MSc in Environmental Management to submit their work, and we have prepared an edited summary of some of the results. I would like to thank Professor Dr Murtezan Ismaili, Director of the Institute for Environment and Health Studies, for his assistance. The Institute is developing expertise of major importance in R. Macedonia's ever closer links with the EU and we hope this issue of the Review will stimulate interest in using that expertise.

The call for the next issue of the Review will be published later in the year, with a target date of October/ November 2008 for the sixth issue.

Mirë se erdhët në botimin e pestë të SEEU Review. Këtë botim ia kemi kushtuar një çështjeje shumë të rëndësishme, mbrojtjes së ambientit dhe fushave të ngjashme, duke filluar nga deponimi i mbeturinave në Tetovë dhe prania e aluminit në burimet e ujit, procedurat e emergjencës në repartet nukleare. Në bazë të disa aktiviteteve të raportuara, interesi për mbrojtjen e ambientit, florës dhe faunës lokale është i lartë në mesin e nxënësve dhe studentëve, por duke kumtuar atë se çka është bërë gjatë procesit edukativ mbetët edhe shumë për tu bërë. Fakti që UEJL ka zbatuar menaxhim ambiental si të ujit dhe deponive të mbeturinave që nga viti 2001, dhe në mënyrë të dukshme ka zvogëluar konsumin e energjisë elektrike nëpërmjet

një menaxhimi të kujdesshëm, pra, edhe njëherë kjo ilustron një model për rajonin, por pak të njohur më larg.

Ne mirëpresim bashkëpunimin akademik me stafin e Universitetit Shtetëror të Tetovës, Universitetit të Prishtinës dhe të tjerëve nëpërmjet punimeve të ndryshme të japin kontribut. I kemi inkurajuar studentët tanë në programin e magjistraturës Menaxhimi i ambientit të dorëzojnë punimet e tyre dhe ne kemi përgatitur një përmbledhje të redaktuar të disa rezultateve. Do të doja të falënderoj për ndihmën e tij prof.dr. Murtezan Ismaili, Drejtor i Institutit të Ambientit dhe Shëndetit. Instituti është duke krijuar një përvojë të një rëndësie të madhe për Republikën e Maqedonisë, tash më shumë se kurë lidhje më afërta me BE dhe ne shpresojmë se ky botim i SEEU Review, do të stimulojë interesin për përdorim të kësaj ekspertize.

Thirrja për botimin tjetër të SEEU Review do të shpallet më vonë gjatë vitit, si objektiv për botimin të numrit të gjashtë, do jenë muajt tetor/nëntor 2008.

Ово е петото издание на Научниот магазин на ЈИЕУ. Ова издание ние го посветивме на многу важниот предмет за истражување - заштитата на животната средина и на слични сфери во научната област, кои се однесуваат на отстранување на отпадот во Тетово, на присуството на алуминиум во изворите, на итните процедури во нуклеарните капацитети. Според некои трудови кои се објавени во овој магазин интересот за зачувување на животната средина и на флората и фауната на локалната средина очигледно е висок кај средношколците и кај студентите, но изгледа дека комуницирањето за тоа што е направено преку образовниот процес е далеку од очекуваното. Фактот дека ЈИЕУ го применува менаџментот на животната средина на своите системи за вода и за отстранувањето на отпадот од 2001 година и значително ја има редуцирано употребата на електричната енергија преку внимателно менаџирање, го илустрира сево ова повторно како модел во регионов, но не и пошироко.

Ние ја поздравуваме академската соработка со кадарот на Државниот универзитет од Тетово и со Универзитетот од Приштина, како и трудовите на многу други соработници. Ние ги охрабривме студентите од нашата магистерска програма за менаџмент на животната средина да ги достават своите трудови и подготвивме едно резиме на некои од резултатите. Би сакал да се заблагодарам за

помошта на проф. д-р Муртезан Исмаили - директорот на Институтот за животна средина и здравје. Институтот развива експертиза за важноста на блиските врски на Р. Македонија со Европската унија и се надеваме дека ова издание на Научниот магазин ќе поттикне понатамошен интерес за употреба на таа експертиза.

Повикот за доставување трудови за следното издание на Научниот магазин ќе биде објавен годинава . Шестото издание на Научниот магазин се очекува да излезе од печат во октомври/ ноември 2008 година.

Dennis Farrington
Pro-Rector for Research, SEEU
Pro-rektor për hulumtime, UEJL
Проректор за истражување, ЈИЕУ

Institute for Environment and Health

Murtezan Ismaili PhD
Director of Institute for Environment and Health

The Institute for Environment and Health was founded on 01 November 2005 within the framework of South East European University Tetovo, with the aim to provide organizational and development activities, scientific research and to promote and strengthen awareness and partnerships for protecting and improving the environment and health on the regional and global levels. The institute is interdisciplinary and will comprise 10 academic staff, 5 external research associates, 30 research students and 3 administrative staff. The Institute is well equipped for field-based studies and has adequate computing facilities. Our contribution consists in progressing environmental and health issues, providing and developing programmes of studies with adequate literature, good conditions for science-research activities, promoting environment and health through public awareness, maintaining the library with literature permanently and increase our level of impact and professionalism through partnerships and co-operation with regional and international institutions and organizations.

Strategic goals of the Institute for Environment and Health (IEH) – SEEU

- Education field: develop and organize programmes of studies through a multi- disciplinary approach;
- Implement science-research programmes and projects;
- Increase public awareness for developing health and environment;
- Build partnerships and co-operation with national and international institutions;

The mission of the Institute is to develop technical and scientific information related to environmental topics, and also training of human resources in order to inform the society on environmental and health themes, in addition to providing support for decision making processes,

encouragement of environmental protection, and promotion of sustainability during usages of natural resources.

Accordingly, the main fields of activity and objectives of the Institute are:

- To promote studies of environmental sciences in all levels of formal and informal education;
- To support, encourage and undertake research in the field of environmental studies;
- To organize, manage and include: conferences, seminars, symposiums, workshops, as well as to provide high-quality personnel to lecture and demonstrate all aspects of environmental disciplines;
- To publish newspapers, books, reviews, booklets and brochures with the purpose of better information of all levels of population;
- To advise and help the Government and its Agencies on environmental issues with a wide public interest;
- To facilitate fruitful collaboration within governmental and nongovernmental institutions, societies and other organizations;
- To collaborate and be a member of international organizations of the same field;
- To create and raise awareness of population regarding environmental issues in order to prevent and increase quality of life.

Instituti për mjedisin jetësor dhe shëndetin

Instituti për mjedisin jetësor dhe shëndetin u themelua më 1 nëntor 2005 në kuadër të Universitetit të Evropës Juglindore në Tetovë, me qëllim që të ofrojë aktivitete organizative dhe zhvilluese, hulumtuese-shkencore si dhe të nxisë dhe forcojë vetëdijen dhe partneritetin për mbrojtjen si dhe përmirësimin e mjedisit jetësor dhe shëndetit në nivel rajonal dhe global. Instituti ka karakter interdisiplinar dhe përfshinë10 anëtarë të stafit akademik, 5 bashkëpunëtorë hulumtues të jashtëm, 30 studentë hulumtues dhe 3 anëtarë të stafit administrativ. Instituti është i pajisur mirë për studimet e bazuara në terren dhe ka pajisje përkatëse kompjuterike. Kontributi ynë bazohet në mbarëvajtjen e problemeve të mjedisit jetësor dhe shëndetit, ofrimin dhe zhvillimin e progameve të studimeve me literaturë përkatëse, kushte të mira për aktivitete hulumtuese-shkencore, promovimin e mjedisit jetësor dhe shëndetit përmes vetëdijësimit publik, furnizimin e bibliotekës me literaturë adekuate në mënyrë të vazhdueshme si dhe rritjen e nivelit tonë të ndikimit dhe profesionalizmit përmes partneriteteve dhe bashkëpunimit me institucionet dhe organizatat rajonale dhe ndërkombëtare.

Qëllimet strategjike të Institutit për mjedisin jetësor dhe shëndetin – UEJL

- Lëmia arsimore: zhvillimi dhe organizimi i programeve studimore pëmes qasjes multidisiplinare;
- Implementimi i programeve dhe projekteve hulumtuese-shkencore.
- Rritja e vetëdijes publike për zhvillimin e mjedisit dhe shëndetit;
- Ndërtimi i partneriteteve dhe bashkëpunimit me institucionet nacionale dhe ndërkombëtare.

Misioni i Institutit për mjedisin jetësor dhe shëndetit, është që ta zhvillojë informacionet teknike dhe shkencore lidhur me çështjet që kanë të bëjnë me mjedisin jetësor, si dhe të bëjë trajnimin e burimeve njerëzore me qëllim që ta informojë shoqërinë me tematikat e mjedisit jetësor dhe shëndetit, për të ofruar mbështetje për proceset e vendimmarrjes, inkurajimin për mbrojtje të mjedisit, si dhe promovimin e qëndrueshmërisë përgjatë përdorimit të resurseve natyrore.

Sipas kësaj, fushat kryesore të aktivitetit dhe objektivave të Institutit janë:

- Promovimi i studimeve të shkencave të mjedisit jetësor në të gjitha nivelet e edukimit formal dhe joformal;

- Mbështetja, inkurajimi, si dhe hulumtimi në fushën e studimeve të mjedisit jetësor;

- Organizimi, menaxhimi, përfshirja në: konferenca, seminare, simpoziume, punëtori, si dhe të ofrojë personel adekuat për të ligjëruar dhe demonstruar të gjitha aspektet e disiplinës së mjedisit jetësor dhë shëndetit.

- Botimi i gazetave, librave, revistave, fletushkave dhe broshurave me qëllim të informimit më të mirë për të gjitha nivelet e popullatës;

- Ta këshillojë dhe ndihmojë Qeverinë si dhe Agjencionet e saj për problemet e mjedisit jetësor që janë me interes të gjerë për publikun;

- Të nxisë bashkëpunim të frytshëm ndërmjet institucioneve qeveritare dhe joqeveritare, shoqatave dhe organizatave tjera;

- Të bashkëpunojë dhe të jetë anëtare e organizatave ndërkombëtare të të njëjtës lëmi;

- Të krijojë dhe rrisë vetëdijen e popullatës lidhur me problemet e mjedisit jetësor me qëllim të parandalimit dhe rritjes së cilësisë së jetesës.

Институт за животна средина и здравје

Институтот за животна средина и здравје е основан на 1ви ноември 2005 година во рамките на Универзитетот на Југоисточна Европа во Тетово, со цел да се овозможи обезбедување на организациски и проширувачки активности, научно-истражувачи активности, активности за поттикнување и зајакнување на свеста и партнерството и активности за одбрана и подобрување на животната средина и здравјето на регионално и глобално ниво. Институтот е интердисциплинарен и е сочинет од 10 члена од академскиот кадар, 5 надворешни истражувачки соработници, 30 истражувачки студенти и 3 члена од административниот кадар. Институтот е солидно опремен за студии од областа и поседува соодветни компјутерски капацитети.

Нашиот придонес се состои во решавање на проблемите кои се однесуваат на животната средина и здравјето, овозможувањето и проширувањето на студиите на програмата со адекватна литература, добри услови за научно-истражувачките активности, поттикнувањето на животната средина и здравјето преку јавната свест, постојано одржување на библиотеката со литература и зголемување на нашето ниво за професионалност преку партнерства и соработка со регионални и меѓународни институции.

Стратешките цели на Институтот за животна средина и здравје – Универзитетот на Југоисточна Европа

- Едукација: развивање и организирање на програмата за студии преку мултидисиплинарен пристап
- Имплементација на научно-истражувачки програми и проекти
- Подигнување на јавната свест за заштита на животната средина и здравје
- Воспоставување на партнерства и соработка со национални и и меѓународни институти

Мисијата на Институтот за животна средина и здравје е да ги прошири техничките и научните информации кои се однесуваат на темите на животната средина, исто така и да ги обучи човековите ресурси со цел да го информира општеството со тематиките на животната средина, за да го поддржи процесот на одлучување,

охрабрување за едно заштита на животната средина , исто така и промовирање на употребата на природните ресурси.

Следствено на ова, главни области на активностите и целите на Институтот се:

- Промовирање на студиите за животната средина на сите нивоа на формална и неформална едукација.
- Поддршка, охрабрување и отпочнување на истражувања од областа на студиите за животната средина.
- Организирање, менаџирање на конференции, семинари, симпозиуми, работилници обезбедување квалитетни кадри кои ќе ги предаваат и демонстрираат сите аспекти на дисциплината за животната средина и здравјето.
- Издавање весници, книги, брошури со цел подобро информирање на сите нивоа на народот.
- Советување и помош на Владата и агенциите за проблемите од јавен интерес кои се однесуваат на животната средина .
- Овозможување плодна соработка помеѓу владата, институциите, локалните самоуправи и граѓанскиот сектор
- Соработка и членување во интернационални органи-зации од исто поле.
- Создавање и зголемување на свеста на народот во однос на проблемите за животната средина со цел да се заштити и зголеми квалитетот на животот.

Legal aspects of environmental protection in Macedonia

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Abstract

This paper covers the legal aspects of legislation of the Republic of Macedonia toward environmental protection and development, by considering the actuality and importance of this issue for our health, but also for the integration process of the Republic of Macedonia in the European Union through the fulfillment of environmental standards. Three main issues are discussed and analyzed in this paper: constitutional dispositions related to environment, environmental protection in the Penal Code of the RM and environmental development in the Environmental Law of the RM.

Some comparative aspects and opinions are also stated within the paper in order to serve as recommendations for the institutions of this country to develop and undertake concrete actions that will lead to better living conditions and environmental protection. The analysis presents the actual condition and the legislation of the RM in the field of environment and the main areas that need to be improved for achieving EU standards.

Abstrakt

Ky punim përmban aspektet juridike të legjislacionit të Republikës së Maqedonisë lidhur me mbrojtjen dhe zhvillimin e ambientit jetësor, duke patur parasysh aktualitetin dhe rëndësinë që ka kjo tematikë për shëndetin në përgjithësi, gjithashtu edhe për procesin integrues të Republikës së Maqedonisë në Unionin Evropian përmes përmbushjes së standardeve të ambeintit jetësor. Tre çështje kryesore janë trajtuar në këtë punim, edhe atë: dispozitat kushtetuese për mjedisin, mbrojtja e mjedisit në Kodin Penal të RM-së dhe zhvillimi i ambientit në Ligjin për Ambeintin Jetësor të RM-së.

Gjithashtu në këtë punim janë përfshirë edhe aspekte krahasuese dhe konkluzione me qëllim që të shërbejnë si rekomandime për institucionet e ndryshme shtetërore dhe qytetare rreth synimeve dhe aktiviteteve që duhet zhvilluar në të ardhmen për të mbrojtur mjedisin që të kemi kushte më të mira jetese. Analizat japin të dhëna për gjendjen aktuale të legjislacionit të RM-së në sferën e mjedisit dhe sferat të cilat kanë nevojë që të përmirësohen për të arritur standarded e UE-së.

Абстракт

Овој абстракт содржи правни аспекти на законодавската рамка на Република Македонија за заштита и унапредување на животната средина, имајќи ја предвид важноста на оваа тематика за здравјето и околината, исто така и за интегративните процеси на Република Македонија во Европската Унија преку исполнување на стандардите за животна средина. Три важни сегменти се третрани во овој труд: уставни норми за средината, заштитата на животната средина во Кривичниот Законик на РМ и унапредувањето на средината во Законот за Животната Средина на РМ.

Исто така, во овој труд се покриени компаративни аспекти и заклучоци со цел истите да послужат како предлози за државните и другите институции во врска со активностите кои треба да се преземат во иднина за заштита на средината. Анализита даваат податоци за сегашната состојба на македонското законодавство на полето на животната средина со цел негово подобрување и исполнување на стандардите на ЕУ.

Introduction

Nowadays environmental development and protection remain key issues in a global scale since numerous scientists and scholars are appealing for intervention against pollution and destruction of the environment. The risk posed as a consequence of human carelessness and disrespect for natural resources, negatively influences climate change, agricultural endeavors, human health etc.

Being aware of these facts and the detailed and concrete reports for environmental risks, the protection of the environment started to become more and more important and necessary. Natural resources, environmental problems in urban areas, the pollution of water and air, the pollution of the seas and soil, were seriously considered by WHO, IAEA, WMO, FAO, UNESCO, etc. In this respect the United Nations, as an international organization, developed concrete programs and special units that would deal with environmental issues. In 1972, the General Assembly of the UN approved the United Nations Environmental Program (UNEP), in order to monitor important environmental changes and encourage and coordinate beneficial ecological actions. The development of an environmental field by UNEP resulted in international environmental law recommendations and practices.

All these events in the global level were reflected into legal protections of the environment in the national level by national legislations. Developed countries were the first to include environmental protection in their legislations, not just because of the fact that the rule of law would provide this opportunity for them easily, but also because they were mostly affected by the harm of pollution in their environment as an outcome of technologies that were not in accordance with environmental standards.

The environment in the law of R. Macedonia

Legal aspects of environmental protection in Macedonia are stated in the Constitution of the Republic of Macedonia (RM). Considering the fact that Macedonia belongs to the continental system and written law, the constitution is a major legal act that provides the basis for concrete laws and regulations. Article 8 of the Constitution of the RM guarantees the regulation and humanization of space, and the protection and development of the

environment and nature. Everyone has the right for a healthy environment and everyone shall develop and protect the environment. Macedonia provides conditions for citizen's right toward a healthy environment (Article 43 of the constitution of the RM).

Furthermore, under special circumstances the free market can be subject to restrictions for the protection of the environment and human health (Article 55 of Constitution). These articles involved in the Constitution of the Republic of Macedonia provide elementary acts and efforts for environmental protection and development. As a conclusion we can say that, even though more articles can be included for environmental development and protection in the constitution, the current constitutional provisions provide room for the concrete treatment of environmental issues through laws and regulations. In this aspect, Macedonia is making efforts, which beside the political and the economic approach toward European standards, include environmental legal and practical endeavors. The practical implications of these efforts will be hard to be achieved in the near future but with more will and focus on environmental development and the rule of law in a national level, a lot of progress is possible.

Environmental protection is regulated and protected with concrete law dispositions. Environmental law (Official paper of RM, nr.53/2005) covers the right and obligations of the Republic of Macedonia, the municipalities, the city of Skopje and also the rights and obligations of juridical and physical persons to assure the necessary conditions for the protection and development of the environment, in order to realize the standards for a healthy environment.

Activities for the protection and development of the environment are of public interest, and so the Government of Macedonia is obliged to provide financial support for the protection and development of the environment (Article 3 of the Environmental law, paragraph 1 and 2).

The goals of this law are stated in Article 4:

1. protection and development of the environment
2. protection of human life and health
3. protection of biological diversity
4. rational and sustainable use of natural resources
5. implementation and development of efforts for solutions of regional and global problems concerning the environment

Environmental aspects in the Penal Code of the RM

The human role in the biosphere is far reaching, with not only devastating but also positive effects. Frequently interfering in natural balances causes environmental pollution.

Environmental pollution means disadvantageous modification of the environment, as an absolute or partial consequence of human activity that negatively changes disperse criteria of the energy flux, the physical-chemical content of the environment and dense of sorts. The main biosphere pollutants are physical pollutants (radioactive radiation, thermo pollution, noise and ultrasounds); chemical pollutants (natural-mineral or organic products, synthesis substances that were non-existent before); and biological pollutants (microbiological infections, intrusive consequences that appear at life earth, etc.)

Latifi (2005) defines pollution as qualitative and quantitative changes of physical, chemical and biological characteristics of main components of the environment (water, air, earth, food, etc.) that cause the disorientation of the ecosystem legality based on self arrangement mechanisms. Those changes are present today, but in the future their effect may have a greater impact on the environment, and in this respect they will worsen living conditions, economic-productive conditions etc.

No society is immune from criminality and its negative impact. Having in mind that the environment is a multidisciplinary subject, criminality here presents itself in different ways and size. Criminal acts against environment are very present in a global scale, if we consider water pollution, air pollution, forest devastation, etc. Here we can add the pollution from heavy industries and technologies that day by day is getting more riskier for the environment.

Ecological criminality is the modern form of criminality and in order to define this notion we should start considering all elements that criminality includes, adding here the characteristics of environmental protection. The content of ecological criminality covers all forms of activities that are directed toward environmental degradation and incriminated as criminal acts in Penal Codes and specific laws.

There are many issues that contribute for this level of environmental protection. Some of them are: partial and uncompleted law dispositions for environmental protection, inadequate dispensation of competences and

authorizations of an environmental character, unprofessional organs and experts for environmental issues, lack of preventive and punitive measures for environmental protection for state organs and the civil sector etc.

The Republic of Macedonia has incorporated into its Penal Code articles against "environmental crimes". In this aspect, human illegal activities oriented against the environment are considered criminal crimes ("Penal crime").

Based on the Penal Code of the RM activities considered as criminal environmental acts are: pollution of drinking water, discharging harmful materials in water resources, cisterns or similar, destroying forests and national parks, burning forests, polluting the air through fume and toxic gas releases, radioactivity etc. Anyone committing these crimes, whether consciously or not, will bear the consequences of their actions according to punitive provisions in the law (three months to three years in prison for small and medium harm, and up to 10 years for serious harm to the environment). Pollution limits from gases, liquids and radioactive materials are assigned by the adequate organs of the state.

The aforementioned environmental criminal acts are covered from Article 218 until Article 236 of the Penal Code of the RM. For example, Article 226 states that forest devastation is a criminal act; anyone caught devastating forests will be punished in cash or up to three years in prison. Article 227 classifies inciting forest fires as a criminal act. Everyone that shall commit this criminal act will be punished from one year up to ten years in prison.

From this summary of the Penal Code and regulation, it is clear that only major environmental damages are covered in it and a lot of other aspects concerning health are left out of the punitive criteria. In comparison with European standards there should be more legal development in environmental issues and a lot of acts ought to be harmonized with EU criteria. The variation of punishments makes it hard for judges to decide about those damages. Other pollutants, like huge industries, factories and big enterprises are not covered in the penal code. This gives space for disordered use of natural resources, carelessness in air pollution etc., by industries and other enterprises.

Environmental development in RM

The Government of the Republic of Macedonia has formed a special ministry called the Ministry of Spatial Planning and the Environment, aiming to undertake activities for environmental protection and development. This ministry has its own budget dedicated just for spatial planning and the environment. Within this budget, programs and projects for the civil sector that will lead to local initiatives for environmental awareness, protection and sustainability are also covered. Concrete sectors deal in the sphere of legal preparations and proposals for the environment, while others monitor the environmental situation on a national level, deal with public affairs, coordinate international activities etc.

It is important to mention the National Ecological Action Plan (NEAP) that has defined a set of priorities in those spheres:

- improvement of water quality
- improvement of air quality
- management with solid waste
- protection of biodiversity
- improvement and sustainability of forests

All those priorities have been developed and prepared to be incorporated in the legislation of Macedonia in order to oblige the state to protect them. Perhaps the process is advancing slowly, but the efforts prove the willingness and need of environmental protection.

Recommendations of this ministry toward legal priorities consist of harmonization of the new legal framework with standards of the EU and the ratification of international conventions for environment and their incorporation into the legal framework of Macedonia. Building an evaluation system of the ecological impact of investment projects will lead to more benefits in an economic aspect for the country. The collected data of the environmental situation should be made available to the public. The nongovernmental sector should be motivated to undertake environmental activities and inform the population for environmental risks, thus increasing the environmental awareness.

Even though there have been decent efforts and activities for the protection of the environment, an issue that causes major obstacles in the environmental agenda is political instability in the country. Frequent changes of political programs and the lack of expertise in key areas are problematic for the protection and development of the environment. Changing this situation requires time and investment in professionalizing local staff for environmental issues.

Conclusion

The general political climate for the environment in Macedonia is moving toward positive reforms because the awareness about environmental pollution is beginning to affect the general population, and consequently the politics of the country. Macedonian efforts toward the protection and development of the environment should be greeted because they show and certify the will for environmental development. But at the same time, serious difficulties involved in the process of legal aspects of environmental protection can be seen and thus need special attention.

The activation of NGOs environmental sector will undoubtedly have a positive impact by raising the citizens' awareness for the obligations they have toward the environment.

The Ministry of Internal Affairs (the police) plays an important role for environmental crime prevention by acting in the field of detection and prevention of environmental crimes. The formation of special police force units with expertise in the field of environment which will deal with the detection of "criminal pollutants", will analyze industrial pollutants, and other hazards, will prepare reports and effectively target environmental risks is more than necessary.

Macedonia is aspiring to become an EU member state and in this respect environmental requirements have to be fulfilled. We have concrete examples of neighboring countries like Bulgaria which have made huge reforms in this aspect. Focusing on economic and environmental development is one solution. The ratification of international environmental conventions and their incorporation in Macedonian legislation will help toward this end. Moreover, the concrete implementation of those laws and programs prepared by ministries, universities and other institutions, will lead to improvements of the environment and living conditions. Those recommendations should be

seriously taken into consideration and Macedonian politics needs to dedicate more significance to environmental issues in the future.

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Safety and Health at Work in the Republic of Macedonia

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Abstract

Safety and health at work is a multi-disciplinary sphere including technicians, medical, psychology, organization, andragogy etc. in which a large number of acts dedicated to various specific activities and working processes exist. The aim of this work's approach is the realisation of this sphere as problematic and complicated on one side, and on the other side it presents a general social interest perhaps also an important economic category for employers. Apart from this, the work analyses the current situation regarding professional illnesses of employees, accidents at work, with special emphasis on fatal accidents, and also the judicial system, respectively the judicial protection of this sphere, especially the basic characteristics of the respective legislation from the insurance and health during work, including civil policies. We hope that this work, however limited, will make a modest contribution in describing the weight and importance that this sphere has in society.

Abstrakt

Siguria dhe shëndeti në punë është një sferë multi-disiplinore e cila përfshinë sferën e teknikës, medicinës, psikologjisë, organizimit, andragogisë etj, në të cilat ekzistojnë një numër i madh aktesh që u dedikohen veprimtarive të ndryshme specifike si dhe proceseve të punës.

Qasja e këtij punimi ka për qëllim aktualizimin e kësaj sfere sa problematike po aq edhe e ndërlikuar nga njëra anë, kurse në anën tjetër ajo paraqet interes të përgjithshëm shoqëror, mbase edhe një kategori të rëndësishme ekonomike të punëdhënësve.

Në veçanti punimi e zbërthen dhe e analizon situatën aktuale lidhur me sëmundjet profesionale të punëtorëve, lëndimet në punë, me theks të posaçëm lëndimeve fatale me pasoja të vdekjes, si dhe sistemin e rregullimit juridik, respektivisht mbrojtjes juridike në këtë sferë, e në veçanti karakteristikat themelore të legjislacionit përkatës nga sfera e sigurisë dhe shëndetit gjatë punës, duke përfshirë edhe politikat qeveritare si një nga politikat e veta.

Shpresoj se ky punim, sado që i kufizuar, do të japë një kontribut modest në aktualizimin e peshës dhe rëndësisë që ka kjo sferë në shoqëri.

Апстракт

Безбедноста и здравјето при работа е мултидисциплинарно подрачје (техника, медицина, психологија, организација, андрагогија и др.) во кои постојат голем број на прописи кои се однесуваат на специфични дејности и процеси на трудот.

Пристапот на овој труд има за цел актуализирање на ова област, колку проблематична толку и сложена од една страна, додека од другата страна таа претставува јавен општествен интерес како и една значајна економска категорија на работодавците.

Посебно во овој труд се анализира актуелната ситуација поврзана со професионалните заболувања, повредите при работа, со посебен осврт на тешките повреди со смртни последици, како и правниот систем кој ја уредува оваа област, односно правната заштита на оваа сфера, и посебно основните карактеристики на соодветното законодаство од областа на безбедноста и здравјето при работа, опфаќајќи ја и владината политика како една од нејзините политики.

Се надевам дека овој труд ќе даде еден скромен придонес во актуализирањето на значајноста што ја има оваа област во општеството.

Introduction

The existing social and economic changes as well as the political and economic instability, the transition process, introduction of the market economy, stagnation of the economic activities in R. Macedonia had a huge impact over the working environment, working conditions, occupational safety, health condition and the work ability of exposed workers. The big changes in the global economy, continuous changes in the working life and the responsibility of the employers created an urgent need for reinforcement and adaptation of the ways and methods that are used for a healthy life and working environment and safety, increasing their level on national, local and on the enterprise level. It is necessary to achieve an optimal balance between the economic and business interest on one side and working ability and health (physical, mental, social) of the workers and their families on the other side. Political crisis and war conflicts with direct or indirect material and psychological impact are changing environmental conditions and are disrupting the normal way of life bringing even higher exposure of the population to different ecological risk factors. Specific health-ecological occupational risk is mostly presented in the mining, metallurgic, energetic, chemical industry (organic and non-organic) as well in construction, textile leather, food industry (bakery, sugar production, production of beer) tobacco and wood industry, agriculture etc.

The presence of numerous old technologies, use of old equipment and machinery as well as not always appropriate safety measures on the working place are presenting additional burden. On the other hand, even more dangerous is the threat by inadequate implementation of new technologies with a numerous unknown risks and dangers, especially in small and medium-sized private enterprises. The additional problem is presented with lack of data for health indicators in this area (occupational diseases, injuries at work, absenteeism etc). Among other things this is result of the inappropriate status of the occupational health services (OHS) with over 200 highly qualified professionals.

Occupational diseases in R. Macedonia

There is lack of official data on incidence and prevalence of occupational diseases in R. Macedonia despite the broad abilities and risks for their presence in large number of exposed workers. The register of the occupational diseases is not functioning and the reason for that is inappropriate legislation so far, verification, registration and evidence of occupational diseases as well as inappropriate organization and functioning of the occupational health services from where the basic data should origin – diagnosed occupational disease. Also there is no coordination with the recommended statistic of the EU. The number of registered cases of occupational diseases in RM is very small in the last decade and with an average 20-30 cases per year (due to sporadic registration) which is not corresponding with the real situation because unregistered occupational diseases can not be equalled with their absence from the specific morbidity in the country. In December 2004 the anachronous and inadequate legislation in the domain was harmonized with EU legislation with the publishing of the new List of occupational diseases in Official Gazette No. 88/04 with which EU Commission recommendation of 19/09/2003 concerning the European schedule of occupational diseases was accepted. At the same time a change was endorsed in the other segments of the methodology for following of the occupational diseases: enlisting, evidence and registration of occupational diseases as well as coordination with EU in this domain – EODS methodology of EU. The preparation of the new design of the Register for Occupational Diseases in RM is ongoing and the Institute of Occupational Health is responsible for its creation as a Collaborating Centre of WHO, with planned activities as part of the two year collaboration between the regional office of WHO and Ministry of Health of RM.

Injuries at work in R. Macedonia

Injuries at work are better registered in comparison with occupational diseases and the rate is much higher. In the EU countries the rate of injuries at work is 13-73/1000 workers. In R. Macedonia in the period 1987-1996 a decrease of total number of occupational injuries was registered from 12691 in 1987 to 3909 in 1996; (Republic Institute for Health Protection) which is a reflection of the decrease of the total number of employees as well as to improper enlisting and evidence. In the beginning of the 90's the rate for injuries at work was about 12/1000 employees (1993, 1994, 1995).From

1997 to 2002 the rate for injuries at work is between 6-12/1000, calculated on the actual number of the employees in the state in the considered year, that is pointing to a lower number than the one in the EU. According to the existing evidence injuries at work are happening more often in male workers (about 80%) and the distribution of the injuries at work concerning the gender is certainly a result of the type and the character of the work as well as the potential risk at the workplace. The most risky occupations concerning the injuries at work in our country are: mining, construction, agriculture and traffic and the health service. The number of deaths caused by injuries at work registered in our country is a reflection of the complete situation in the state and the transitional process. This number varies for the period 1991-1999 and is from 0 (1999) to 34 cases (1991). During 1998 -2002 there is a trend of decline (6-8 cases) or annual average of 3.6 (1 case in 100000 employees), while in 2004 a significantly larger number of death cases due to injuries at work is registered (total of 18), in 2005 (7 cases) in 2006 (4 cases) while in 2007, there was a total of 19 cases registered with fatal injuries. As in 2004, in 2007 the largest number of fatal injuries causing death occurred in construction. In 2007, 13 cases occurred in construction, 4 in industry, 1 in forestry and another one in electro-economy sector.

The increased number of cases is also due to the new legislation, respectively the new Law on safety and health at work (2007) since the employers' responsibility in the safety field is not only for the employees, as it was prior to approval of this legal act, but also for all those engaged in the working process.

Another indicator is that the past year (2007) comparing to other years, was the most active one with construction activities. It is worth mentioning that almost half of those injured in construction with fatal consequences occurred while digging ditches, respectively in setting tubes for different needs, or underground cables, by not securing the conduits' walls from the downfall of the accumulated ground, and this was mainly the case causing the death of individuals at the working places.

Protection system during work in R. Macedonia comparing to EU system

The complete legislation concerning health, living and working environment and safety at work is applied with difficulties in the praxis. In the field of workers' safety and health, the Law on safety and health during work was adopted in July 2007, which was fully harmonized with EU request (EU directives (89/391/EEZ dated 12/06/89 for workers safety and health). I see it reasonable to underline some essential features of this Regulation, being the judicial basis on the risks threatened to workers on their safety and health. I am indicating these regulations since they are applied in the Macedonian legislation for a first time. As in any democratic country legislation, in the Macedonian legislation as well, the employer has the obligation on the organization and implementation of the workers' safety and health.

General obligations of employers

An employer shall have the responsibility to provide occupational safety and health for the employees in any aspect related to the work. Within the frames of his/her duties, the employer must undertake measures necessary to provide occupational safety and health for the employees, including prevention of occupational risks, provision of information and training, appropriate organization and means of work. An employer shall have the responsibility to introduce such protective measures and to choose such working and production methods that will improve the level of occupational safety and health and that will be included in all activities of the employer at all levels of organization.

An employer can delegate the responsibilities and activities related to occupational safety and health, laid down in this Law, to authorized legal entities and natural persons if the employer is not in a position or if there are neither employed professionals nor technical equipment available to perform such activities and duties independently. An employer shall be bound to provide the authorized legal entities and natural persons with the necessary information and data on the size of the company, institution and other legal entities, the risks that threaten the occupational safety and health of the employees, the activities undertaken for occupational safety and health for each workplace and the environment etc. The outsourcing of authorized legal

entities or physical persons to perform the professional tasks related to occupational safety and health does not exempt the employer from his/her own responsibilities in this field. The responsibilities of the employees pertaining to occupational safety and health do not have an impact on the principle of responsibility of the employer. The authorized legal entities and natural persons engaged by the employer, must cooperate among themselves as well as with the experts responsible for all issues pertaining to preventive occupational safety and health.

The employer shall be bound to plan measures and means for development and progress of occupational safety and health and shall change the existing technological processes with less hazardous i.e. safer processes.

The employer shall implement the measures for occupational safety and health on the basis of the following principles:

- avoiding risks;
- assessing the risks that cannot be avoided;
- dealing with risks at source;
- adjusting the work to the individual, in particular as regards the characteristics ofthe workplace and the working environment;
- choosing the working equipment;
- choosing the chemical substances or preparations;
- choosing the working and production methods;
- implementing the measures necessary to maintain and strengthen the health;
- adjusting to the technological progress;
- replacing the dangerous with non-dangerous or less dangerous;
- developing a comprehensive safety strategy which covers technology,
- organization of work, working conditions, human relations and factors that influence the working environment;
- giving priority to the collective safety measures over individual measures; and
- providing appropriate guidelines and instructions as well as information to the employees.

The employer must adjust the working process to the abilities of the employees whereas ensuring a working environment and means of work which are safe and harmless to the health, taking into consideration the nature of the work.

Each employer must prepare and implement a safety statement for each working position, stating the precise manner and measures that need to be undertaken. If the conditions change or a new risk appears at the workplace and in the working environment, for which a statement has been previously prepared, the employer must draft a new safety statement. A safety statement shall be based on the identification of the hazard, risk assessment of the occupational safety and health and the working environment that this safety statement refers to.

The employer shall organize the occupational safety and health depending on the technological process, by applying scientific and professional methods in compliance with the modern achievements, whereas the professional activities related to safety will be performed by an employee who has educational background in safety at work or other professional background adequate to the technological process of the employer, or the employer will outsource the services of authorized legal entities or natural persons.
The employer shall be bound, with a collective agreement, to guarantee the right of the employees, directly or through a representative, to participate in the identification of the drawbacks and improvement of the working conditions and the working environment of the employer, by being involved in all activities of the company or institution at all levels of organization.

When planning, supplying working equipment and introducing a new technology, the employer shall be bound to consult and cooperate with the employees and their representatives regarding the consequences and risks arising from the choice of the working equipment, due to their influence on the occupational safety and health, working conditions and working environment.

The employer must ensure that the access to the workplaces exposed to specific and serious risks is only allowed to the employees who were given special instructions to work at such workplaces.

The employer must provide signs of danger and instructions for safe use on the working equipment and means of work in accordance with a special regulation.

The employer must ensure occupational safety and health measures especially by:

- appointing one or several safety officers;
- engaging an authorized medical institution that shall perform professional tasks related to health at work;
- taking safety measures to protect against fire in accordance with specific regulations;
- taking first aid measures and evacuation measures in the event of danger;
- providing training for employees on safe performance of their work, based on an individual programme;
- providing personal protective equipment for the employees and its usage, if the safety measures undertaken in the working environment do not suffice;
- undertaking occasional inspections and examinations of the working environment and equipment, and
- monitoring the health condition of the employees.

The primary obligations of the safety officer shall include:

- advising the employer regarding the planning, selection, purchase and maintenance of the means of work;
- advising the employer on the fitting-out of the workplace and the working environment;
- providing professional grounds for the safety statement;
- performing regular controls and inspections of the chemical, physical and biological risks in the working environment;
- performing regular controls and testing of the working equipment;
- performing internal supervision of the implementation of the measures for safe working practices;
- developing instructions for safe working practices;
- monitoring and analyzing the work-related injuries, occupational diseases,
- identification of the reasons thereof, and preparing reports for the employer, together with all proposed safety measures, and
- developing a programme and carrying out training for the employees for safe working practices.

The primary duties of the authorized medical institution depending on the type of the activities performed by the employer, as well as on the type and level of the risk from injuries or hazards to health at work shall include:

- conducting preventive medical check-ups of employees, according to the special regulations;
- providing medical services for employees suffering from occupational diseases;
- organizing and providing first aid to the employees in case of workplace injury or collective accident;
- identifying and determining the causes of work-related disabilities and occupational diseases as well as workplace injuries, and proposing appropriate safety and curative measures, participating in the appropriate professional rehabilitation and providing consultancy to choose more suitable work tasks;
- giving proposals and measures to an employer for protection of the health of the employees exposed to severe danger of injuries or health impairment;
- record keeping and collection of data on the health of the employees in accordance to specific regulations;
- participating in any assessment to the risks, safety and health at the workplace and working environment; and
- acquainting the employees with the risks related to their operation, workplace and education.

The employer must provide medical check-ups for the employees at least every 18 months.

Employee's rights and obligations

It is the right and obligation of every employee to take care of his/her own safety and health and the safety and health of other people that work with him/her in line with the trainings and instructions provided by the employer, to be familiar with occupational safety and health measures and to be trained to implement them. It is the right and obligation of every employee to make proposals, give opinions and remarks regarding occupational safety and health to the safety officer and the authorized medical institution.

An employee shall be entitled to refuse to perform work if the employee was not been previously informed of all potential hazards and dangers, or if the employer has failed to provide the prescribed medical check-up. An employee shall be entitled to refuse to perform work, if there is imminent danger to his/her health or life, when the prescribed safety measures have not been undertaken and to request their removal. If the employer fails to remove the danger, or does not act in accordance with the opinion of the authorized medical institution, the employee may demand intervention from the competent labour inspector and inform the representative.

An employee may work at a workplace or in conditions of exposure to higher risk of injury or health hazard (work at increased or decreased air pressure, high or low temperatures, harmful radiation, increased vibrations, noise, work with persons suffering from communicable diseases and contagious materials, work with water and moisture, heavy physical work, field work exposed to atmosphere disturbances and other dangers, work in conditions of insufficient or too strong lightning, work in premises contaminated with chemical harmfulness, work under ground or under water, work at high altitudes and depths, work of fly personnel etc.) only on the basis of an assessment of an authorized medical institution confirming that the employee is capable to perform the given duty.

Government policy

The Law on safety and health at work obliges the government to approve a programme on safety and health at work. The programme determines the strategy on development of safety and health at work regarding life, health, and work ability protection of employees, as well as prevention of injures during work and work-related diseases. The government shall establish a Council for Occupational Safety and Health (hereinafter referred to as Council) as an expert advisory body.

The Council shall review and give opinions and recommendations concerning:

- the programme;
- the state of affairs in the field of occupational safety and health, the strategy for coherent policy for preventing and reducing workplace injuries, occupational and other work-related diseases and injures;
- expert grounds for drafting laws and other provisions on occupational safety and health; and

- the documents of international organizations referring to occupational safety and health.

The Council shall be comprised of 15 members, of which 4 members are from representative organizations of employers, 4 members are from representatives syndicates, 3 members are nominated by the government, 1 member is a representative form the faculty and performs education activity in the area of safety at work, 1 member is a representative form the faculty and performs education activity in the area of occupational medicine, 1 member is a representative of the association of safety officers and 1 member is a representative from the association of occupational medicine experts. When appointing the Council members, the principle of fair and equitable representation of all communities in R. Macedonia should be taken into consideration without violating the principle of expertness and competence.

The present situation in R. Macedonia

Up to date, the activities that were undertaken for health, healthy living and working environment and safety at work were dispersed, without being based on a strategy and with an integrated plan of activities. Usually the activities were coming from different ministries, institutions, specialized associations (Ministry of Health, Institute for Occupational Health, Ministry of Labour and Social Affairs and Ministry for Environment and Urban Planning, Macedonian Occupational Health Society, Macedonian Society for safety at work) but without participation of any intersectional body for joint work, tripartite on which the EU insist or the ones that have to realize it have any authority in the matter. In the ongoing reform activities, the number of the services for occupational health (OHS) in Macedonia (that included 53 organizational units – dispensaries, Services at the Health and Medical Centres level, OH unit on the enterprise level) were reduced to 25 in the larger Medical and Health Centres. The number of doctors specialist for occupational medicine that continued to perform their specific specialized OH activities in this units in cooperation with the Institute of Occupational Health were reduced from 126 to 46.

Also there are numerous obstacles in the work of these services, postponing of the reorganization and the strengthening of the services, non existence of inter-sectorial cooperation on local level, absence of multi disciplinary approach with the key partners in the realization of the activities for health and safety at work, non coordinative legislation and EU standards, unofficial intercommunication network between the services and the Institute of Occupational Health, disrespect of the existing legislation for health and safety at work from the employers especially in the small and medium enterprises, unidentified and/or disrespected control mechanisms for surveillance of the conducted activities for safety at work, undetermined participation of the Health Insurance Fund and Fund for Pension and Invalidity insurance, with the income from the additional contribute for obligatory insurance in case of injury or occupational diseases. Thus those services provide only partial service for protection and safety at work.

Conclusion

Health and safety at work as a basic human right, also represents a basic element concerning the social and health dimension for a sustainable development principle. The working ability together with well-being of the individual is a key element for the total socio-economic development of every country. More than the half of the word population belongs to the global working force which is continuously, during its working age, more or less submitted to a large number of factors hazardous to health that originated from the working place. Beside the traditional problems and risks at work (such as noise, vibration, physical workload, biological and chemical agents, infective agents, bad working conditions) to which 25 to30% of the working population is still exposed, the new changes of the working processes and the new technology are carrying new risks and challenges of the professional pathology of the working place, even to those that are looking quite safe and harmless. Those are new chemical substances and materials, some of them with unknown and unidentified hazardous effects, new biotechnological and carcinogenic materials, allergenic substances, highly frequented non-ionizing radiation, ionizing radiation, psycho-social stress, unsuitable ergonomic design etc.

There are additional effects like social and economic conditions, fluctuation of the work force, working place mobility, psychophysical abuse and violence at the work place, the organization of the work and shift-work, dynamic and growing demand on the work as a result of the market

globalization which significantly changes the economic structures and the working conditions at almost every single workplace.

Accordingly, there are no safety or risk free workplaces in the industry, economic or non economic enterprises, service activities, public or private large, medium or small enterprises. Especially in the developing countries with still present out-of- date technology and use of old equipment, without respect of the existing legislative for protection at work and the health surveillance of the workers seized without a Register of occupational hazards and workplaces with occupational risk.

All of this bring up to work injuries, occupational diseases and work-related diseases such as musculoskeletal, psychological, cardiovascular, respiratory, neurological, cancers etc that are cause for a long term absence from work, lowered or terminally lost working ability, invalidity or death. Especially serious is the problem with child labour, people with special needs, unemployed.

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The integrated product policy approach

(European and National Context)

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Abstract

Integrated policy for a product is an approach through which the influence of the environment is decreased in all phases of production of that product: from the phase of design, selection of materials, process of production, distribution, usage and management with generated waste. Basic "philosophy" of this concept is that the aspect of protection of environment has to be a key one at decisions brought by the parties involved at different phases of life cycles of the product. In this work the analysis of policies for integrated policy for production on European level is developed, as well as the scope of problems on the level of national legislation and strategic documents.

Abstrakt

Politika e integruar për produkt është qasje nëpër mes së cilit zvogëlohet ndikimi ndaj mjedisit jetësor në të gjitha fazat nga prodhimi i produktit: nga faza e dizajnit të tijë, zgjedhje e lëndëve të para, vetë procesi i prodhimit, distribucion, nevoja dhe menaxhimi me mbeturinën gjeneruese."Filozofia" themelore në këtë koncept është se aspekti në mbrojtjen e mjedisit jetësor patjetër duhet të jetë i inkuadruar në vendimet të cilat i bartin anët e tanguara të kyçura në fazat e ndryshme nga ciklusi i jetës së produktit.

Në punimin është bërë analizë në politikat për politikë integruese për produkt në nivel evropian, si dhe përfshirja e problematikës veçanërisht në nivel të legjislativës nacionale dhe dokumentet strategjike.

Апстракт

Интегрираната политика за производ е пристап преку кој се намалува влијанието врз животната средина во сите фази од производството на производот: од фазата на неговиот дизајн, избор на суровини, самиот производствен процес, дистрибуција, употреба и управување со генерираниот отпад. Основната ″филозофија″ на овој концепт е дека аспектот на заштитата на животната средина мора да е клучен во одлуките кои ги носат засегнатите страни вклучени во различните фази од животниот циклус на производот.

Во трудот е направена анализа на политиките за инегрираната политика за производ на европско ниво, како и опфатот на проблематиката особено на ниво на национално законодавство и стратешки документи.

Introduction

Integrated Product Policy is an approach which seeks to **reduce the life cycle environmental impacts of products** from the mining of raw materials to production, distribution, use, and waste management. The driving idea is that integration of environmental impacts at each stage of the life cycle of the product is essential and should be reflected in decisions of stakeholders.

IPP focuses on those decision points which strongly influence the life cycle environmental impacts of products and which offer potential for improvement, notably **eco-design** of products, **informed consumer choice**, the polluter pays principle in **product prices**. It also promotes instruments and tools which target the whole life cycle of products.

Integrated…

This refers to consideration of the whole life cycle of products covering all stages from the mining of raw materials to the production, distribution, use, recycling and/or recovery and final disposal as well as to a broad approach integrating various instruments to achieve the goal of greening of products on the basis of co-operation with stakeholders.

From a stakeholder perspective, if their decisions influence the environmental impact of products somewhere else in the product life cycle, upstream or downstream, they must be aware of and take responsibility for the consequences of their actions. From a policy perspective, policy initiatives focusing on particular life cycle stages must not merely shift environmental burdens to another stage. Life cycle thinking needs to be promoted throughout the economy, as part of all decisions on products along with other criteria such as functionality, health and safety.

...Product...

In principle, all products and services are included in the scope of this policy which is aimed at achieving an overall improvement of the environmental impacts of products. In practice, action might address all or only certain products, selected on the basis of discussions with stakeholders because of their importance and their

scope for improvement. In so far as the IPP approach can usefully be applied to improve the environmental impact of services, this should not be excluded although services are not the primary focus of IPP. Nevertheless, services may play an important role in partly or entirely replacing products (e.g. car sharing; voice mail instead of answering machines; dematerialisation potential of the "new economy").

...Policy

The role of public authorities within the IPP approach shall be in most cases one of facilitation rather than direct intervention. The general idea is that policy should focus on setting the main objectives and providing the different stakeholders with the means and incentives to achieve these objectives. Depending on the context, the IPP approach may also be useful in finding business-oriented solutions of environmental problems in discussion and co-operation with stakeholders and/or the preparation of legislation.

Although legislation is not the primary focus of IPP, it should be part of a mix of instruments to be used, if appropriate. This may concern e.g. the legal framework for voluntary action such as eco-label; New Approach legislation; legislation if voluntary approaches do not deliver the envisaged

results and legal security is needed to avoid distortion of competition; and the integration of a more holistic and life-cycle oriented approach into other types of legislation

The role of stakeholders and local initiatives

In order to be able to deal with the very broad scope of potential measures to support the greening of products, the strategy relies on the **strong involvement of all stakeholders on all potential levels of action**. An open dialogue and the creation of incentives to apply general life cycle thinking in relevant decisions are the main fundaments upon which an Integrated Product Policy approach should build.

Consumers will benefit through more information and a higher transparency as regards environmental characteristics of products. Better and more reliable information in an easier understandable form will allow consumers to make informed choices in favour of environmentally friendly products. Greener products and services should offer a higher quality, a longer life and - if environmental impacts are correctly reflected in product prices - a lower overall cost to the consumer.

Non-governmental organisations will be given the opportunity to contribute as a partner to the identification of issues and the development of practical solutions towards reducing environmental impacts of products.

For **industry and retailers**, Integrated Product Policy offers the opportunity to bring in their experience to promote a business-oriented approach towards greener markets on the basis of innovation and economic growth. Businesses will be required to take an active role in bringing about solutions for the environment within companies and industry sectors as well as in co-operation with public administration and nongovernmental organisations. Pro-active companies will both have the chance to leada market transformation process and convert their experience into market opportunities. In particular for businesses operating across Member State borders and non-European companies, a Community framework offers greater consistence of theEuropean market. Experiences gained on the European market may later be transferred to the global level, including developing countries. SMEs will profit from an easier access to information and tools how to reduce the environmental impacts of products. There will also be a special focus on the product chain as a support for SMEs to bring about environmental improvements.

As many examples show, environmental leadership and business development go hand in hand. To quote business associations, "Eco-efficiency does much more than lead a business to a point where environmental benefits balance costs. It is a leadership practice. It serves those leaders who want to stay ahead of the curve and look at the future needs of society, natural resource availability and public perceptions." It is these practices which need systematically to be built upon and broadened to a more general co-operation within industry and between companies, non-governmental organisations and national and local authorities in order to make this way of thinking the norm.

Strategy to implement the ipp approach

In the context of the proposed strategy, promotion of environmental quality of goods and services means **using market forces** to the largest possible extent. Indeed, given the size of the challenge and the multitude of stakeholders involved, the goal can only be envisaged and reached if the different actors recognise the potential in this approach and are committed to achieving it.

The success of a product-oriented environment policy therefore depends on its implementation strategy, on identifying and using the most relevant drivers and the corresponding instruments to ensure a continuous improvement of the environmental characteristics of products within the framework of the Internal Market.

As economic interests are a main driver, the instruments probably most effective are those, like taxes and subsidies, that help to "**get the prices right**", to internalise external costs. However, as long as this is not the case, supplementary action to better inform consumers on the environmental characteristics of products and to encourage producers to develop a better design of products is needed.

The most influential supplement in this respect should be "**green demand**". As far as firms are concerned, one can expect them to improve their environmental performance, including the environmental quality of their products, when it is in their commercial interest. Direct financial cost savings, the improvement of brand image, the perspective of new markets and higher market

shares – these, plus eventually anticipation of regulatory measures, might be listed as main interests. Image and market share both stand for the influence the consumer can exercise, whether the consumer is in the private or the public sector. Given the importance of the public sector, its purchasing activity is one of the most influential factors, allowing for the development of a significant "green market". In order to "green" the demand side in general, information plays a crucial role.

The "greening" of demand, a change of consumer behaviour, can and must be supplemented by **supply side measures**. These cover instruments that encourage firms to apply a life cycle approach for their products. Standards and product directives and support for product design fall into this category, as does product information. Where a value added can be created by bringing together the different stakeholders to elaborate business oriented solutions towards specific problems such as environmental agreements, product panels on the basis of a variable format adapted to specific issues are proposed.

In addition, in order to help this strategy to be implemented, certain new or improved tools might be needed. It might be necessary, for example, to further develop and disseminate easily usable life cycle tools that allow a fast check of the environmental impacts of products, in particular for small and medium-sized enterprises. Tools for the management of life cycle environmental information flow along the product chain might also need further development. Other supportive instruments for the strategy are environmental management and audit systems and accounting and reporting for the environment. This new policy approach should also be supported by a well-focused research and development policy which both supports innovation in the development of environmentally friendly products and services and gives a better understanding of the mechanisms which lead to the greening of products.

National context

With regard to the implementation of the integrated manufacturing policy in the Republic of Macedonia, it has to be admitted that it has not been sufficiently known as such yet; however, individual segments have been partially regulated.

Legal basis has been established with regard to certain segments of the integrated manufacturing policy in the national legislation.

The principle of sustainable development has been incorporated in the Law on Environment, stipulating as follows: "When an activity is undertaken or performed, care shall be taken as to the rational and sustainable use of natural resources so as to ensure that needs for a healthy environment, as well as the social and economic needs of the present generations are satisfied without jeopardising the rights of future generations to satisfy their own needs". The Strategy for Sustainable Development of the Republic of Macedonia is under preparation and it is expected to be adopted in the course of 2008.

Awarding of eco-label, as an instrument for implementation of the integrated manufacturing policy provided for in the Law on Environment, is regulated in its Article 29, according to which Eco-label may be awarded to the producers of consumer goods, which, by applying techniques and technologies for reduced environmental pollution burden during their production, distribution and waste treatment processes, cause less environmental pollution compared to other products, form the same group, except for producers of foodstuffs, beverage and pharmaceutics products. Eco-label may also be awarded to legal and natural persons that provide services which, compared to the service providers from the same group, are less polluting and thus contribute to the protection and improvement of the environment. Eco-label shall not be used on substances or preparations labelled as toxic and hazardous to the environment, or are carcinogenic, toxic for reproduction, or mutagenic, nor to goods manufactured by processes which may be hazardous to human life and health or the environment, or in their normal application, could be hazardous for the consumers. For the purpose of eco-label award, there is a Commission for eco-labelling of products that meet the criteria for the eco-label award. With regard to different types of products, the Law on Environment provides for adoption of specific criteria for the award of eco-label to individual products and services that shall be in line with the criteria applicable in the EU.

The existing Law on Public Procurement contains specific provisions on environmental management standards (which should be in accordance with the Environmental management and audit scheme of the Community-EMAS or in accordance with the relevant and proved European or international standards). The selection of the best bid is conditioned by the environmental aspects of the bid.

The legal grounds for the establishment of the environmental management system in the Republic of Macedonia is provided for in the Law on Environment, which specifies that the environmental management and audit

scheme shall be prescribed by the Ministry of Environment and Physical Planning.

CONCLUSION

With regard to the state in the Republic of Macedonia, it should be underlined that the implementation of the above concept is in the initial stage and there is much to be done. Although there has been certain progress in individual segments, what lacks is integrated approach instead of partial approach practiced at present, i.e. existence of individual policies standing alone without relation to other policies.

To this end, it is necessary to undertake high number of actions, such as:

- the new Strategy for Sustainable Development, which is under preparation and for which the Ministry of Environment and Physical Planning is the responsible authority, there will be separate Chapter on sustainable consumption and production, that will incorporate their implementing policies such as integrated production, corporative liability, etc. This integration will significantly contribute to the promotion of the efficiency of resources and management of material streams, analysis of product life cycle, consumers awareness increase, etc.
- strengthening the capacity in this domain, i.e. its promotion in industry, public administration, non-governmental sector and citizens. Promotion on local level is of particular importance.
- Encouragement and motivation of private sector to undertake action.
- Activities of business sector should be directed towards capacity strengthening and technologies transfer, including use of best practices and technologies that can be supplied by various partners.
- Awareness raising with regard to consumption habits and increase of possibilities for sustainable options.
- Dissemination of information, know-how and technologies and best practices through expert discussions and application of new and web based systems.
- Education in sustainable development that will include the public for the purpose of promoting the benefits of sustainable development.

One of the relevant issues requiring attention and missing at present is certainly the need to promote the concept of integrated manufacturing policy of industry and consumers for the purpose of bringing into the light the advantages and disadvantages offered by this concept, as well as the benefits therefrom. To this end, it is necessary to train the industry on the opportunities offered by IPP, through acquiring knowledge on the benefits from the monitoring of the entire life cycle of the product leading to lower environmental impact, as well as other advantages resulting from this. On the other hand, there is a need to persuade consumers and increase their awareness on the use of environmental products and long-term benefit for both individuals and society as a whole.

Apart from industry and consumers, it has to be noted that it is of particular importance to work towards increasing the awareness of public authorities on the necessity to integrate environmental aspects into public procurement that should actually be promoters of this concept and will from their side make positive effects on companies in terms of this principle application.

The need for investment in research and development, as well as the need for new innovations and use of new technologies are of equal importance, although neglected to a great extent in the Republic of Macedonia, and those are the bearing pillar of the future development of the society and achievement of sustainable forms of development.

Knowledge Management Approach to Emergency Procedures in Nuclear Facilities: *PROMOTE*

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Abstract

A process-oriented and service-based approach to an Enterprise Knowledge Management System (E-KMS) based on the PROMOTE approach can find application also in Nuclear Knowledge Management. The PROMOTE approach represents a framework suitable for non-profit knowledge-based organizations. By embedding Knowledge Management Services (KM-Services) to processes executed by nuclear workers distribution and identification of knowledge is part of the daily work. With a process-oriented, technology-independent E-KMS, knowledge creation and sharing will bring improvements to the overall efficiency and quality of the work performed by nuclear workers or inspectors.

Abstrakt

Një qasje që është i orientuar kah procesi *Enterprise Knowledge Management System* (E-KMS) e bazuar në qasje PROMOTE mund të gjej zbatim gjithashtu edhe në Menaxhimin Njohurive Nukleare (*Nuclear Knowledge Management).* Qasja PROMOTE përfaqëson kornizë të përshtatshme për organizatat jofitimprurëse të bazuar në njohuri. Duke e futur *Knowledge Management Services (KM-Services)* në proceset që kryhen nga punëtor nuklear, shpërndarja dhe identifikimi i njohurive bëhet pjesë e aktiviteteve ditore. Me një proces të orientuar kah teknologjia-pavarur E-KMS, krijimi i njohurive dhe shpërndarja e të njëjtave, do të sjellë përmirësime në efikasitetin e përgjithshëm dhe cilësinë e punës që kryhet nga punëtorët dhe inspektorët nuklear.

Апстракт

Пристапот ориентиран на процес и базиран на услуги во *Enterprise Knowledge Management System (E-KMS)*, базиран на пристапот на ПРОМОВИРАЊЕ исто така може да се примени и во менаџирањето на нуклеарното знаење. Пристапот на ПРОМОВИРАЊЕ преставува рамка достапна за непрофитабилните организации базирани на знаење. Преку вметнување на услугите базирани на знаење и процесите кои ги извршуваат нуклеарните работници, дистрибуцијата и идентификацијата на знаењето е дел од нивната дневна работа. Со услугите базирани на знаење кои се ориентирани на процесот и кои се технолошки независни, создавањето и споделувањето на знаење ќе доведе до подобрувања на целосната ефикасност и квалитетот на работата која ја изведуваат нуклеарните работници или инспектори.

Introduction

Nuclear Knowledge Management is thought to be a discipline mainly concerned with the preservation of knowledge in specific areas of nuclear science and technology (International Atomic Energy Agency, 2007). A knowledge management approach promising the benefits of efficiency and responsiveness to activities performed on a daily basis by nuclear workers at nuclear facilities will be considered. This includes activities performed by national and international IAEA nuclear inspectors.

A process-oriented Knowledge Management System (KMS) based on KM-Services, namely the PROMOTE approach, is described. This is a top-down approach that allows defining business processes and the consisting knowledge activities. On the basis of the so called Knowledge Management Processes (KMPs), which aim at capturing the interaction between knowledge workers in a process-oriented manner, knowledge activities like searching, categorizing or storing information are supported by so called Knowledge Management Services (KMS) (Karagiannis & Woitsch, 2002). This constitutes of the technology layer which serves as an enabler by integrating the activities based on loosely coupled software. The aim is to study the potential of implementing a Knowledge Management System based on business processes that commonly are executed at a nuclear facility. The proposed KMS architecture and various models based on the PROMOTE approach will be discussed.

One of the common processes executed by safeguards inspectors in nuclear facilities is the physical inventory verification and the interim inventory verification. These consist of activities that are based on well defined procedures and are executed by inspectors regularly. A model capturing the interaction between inspectors and facility operators will be used to demonstrate some of the benefits of a knowledge management approach. By identifying the knowledge intensive tasks, the objective is to offer nuclear inspectors with knowledge in an explicit form when found in unfamiliar and emergency situations. Such situations may be caused by events at the facility or unavailability of surveillance and measurement systems. The aim is to provide inspectors with knowledge that will allow them to respond quickly and appropriately. Explicit form of knowledge includes, but is not confined to, topic maps, variety of information products and other resources that lead to understanding of new situations. Furthermore, knowledge activities required to deal with such situations can be supported by KM services making the most of that available technology. Since "KMS is seen as a socio-technological system" (Schneider, 2001) the benefit of the PROMOTE approach is that it offers integration not only at the technological level but also at the application level.

Defining Knowledge Management

The activity of nuclear knowledge management at the IAEA will be reviewed and then an overview of inspector work at nuclear facilities will be provided. Furthermore, the PROMOTE approach will be discussed in the context of knowledge management followed by a practical example of how PROMOTE and knowledge management approaches can be applied in emergency situations at the facility.

It is difficult to miss the growing interest by practitioners and academic researchers alike in knowledge management. The origin of the widespread interest in managing knowledge can be traced back to Peter Drucker. In directing the attention of corporate leaders to the changing economic environment in the late sixties, he was the first to point out that the US had shifted from an economy of manufactured goods to a “knowledge economy.” In the new economy, he emphasized the basic concept is no longer capital but knowledge. Drucker's original insights are now widely accepted, so much so that the basic economic foundation on which society and commerce function is now termed a knowledge economy (Weber, 1993).

Knowledge management is the systemic and organizationally specified process for acquiring, organizing, and communicating knowledge of employees so that other employees may make use of it to be more effective and productive in their work (Alavi and Leidner, 1999). Knowledge management systems (KMS) are tools with an effect manifested in a variety of implementations (Davenport, Long and Beers, 1998) including document repositories, expertise databases, discussion lists, and context-specific retrieval systems incorporating collaborative filtering technologies. It was said by Nonaka (1994) that "Knowledge is a complex concept and a number of factors determine the nature of knowledge creation, management, and sharing." Drawing from prior discussions, we distinguish knowledge from data and information and view knowledge as a “fluid mix of framed experience, values, contextual information and expert insight that provide a framework for evaluation and incorporating new experiences and information” (Davenport and Prusak, 1997). Prior research suggests the existence of different types of knowledge. Knowledge can be either tacit or explicit (Polanyi, 1967); this attribute is also expressed as the distinction between knowing and knowledge (Brown and Duguit, 1998; Cook and Brown, 1999). Tacit knowledge refers to the knowledge that has a personal quality that makes it hard to articulate or communicate or, analogously, the knowing or the deeply rooted know-how that emerges from action in a particular context. In contrast, explicit knowledge refers to the codifiable component that can be disembodied and transmitted, a notion analogous to knowledge, the know-what, which can be extracted from the knowledge holder and shared with other individuals.

The Knowledge Management Liaison Group at the IAEA uses, as a working definition, that “knowledge” can range from technical information laid down on paper or electronically to knowledge embodied in people and in their capabilities and skills, Knowledge extends beyond “information” in that knowledge also includes the value added, that is, expertise required to turn raw nuclear information into an understanding of (nuclear) issues or, in other words, to give the information a meaning. "Nuclear knowledge" is specifically knowledge about or relevant to nuclear related activities (Gowin, 2004).

Nuclear Knowledge Management at IAEA

It can be said that one of the main reasons knowledge management is an important topic for the IAEA and similar organizations is related to the fact

that they are knowledge based entities. A parallel can be drawn with the private sector where organizations falling into this category are called knowledge based economies. In the case of the IAEA its greatest asset is knowledge related to the Non-Proliferation treaty embedded in its organizational memory.

Nuclear Knowledge Management at the IAEA is a programme born at the general conference in 2002 where it started as a cross-cutting activity. The major challenges were categorized as "internal" and "external". "Internal" measures means creating a culture for managing knowledge within the organization whereas the external challenge was working with its member states in preserving and enhancing nuclear knowledge. The efforts were focused mainly on preservation of knowledge kept by nuclear workers reaching retirement age as well as contributing on educational programmes that will develop nuclear knowledge and the field of nuclear technology. The four discernable elements of the Nuclear Knowledge Management relevant to the Agency are:

- Enhancing Nuclear Education and Training
- Preserving and Maintaining Nuclear Knowledge
- Pooling and Analyzing Nuclear Knowledge
- Promoting Policy and Guidance for Nuclear KM

Although since the beginning of the programme the IAEA has made considerable contributions with their work, the focus of its activities remained mainly on preserving and maintaining nuclear knowledge by enhancing the education and training systems on nuclear knowledge (Gowin, 2004).

Since 2002, the IAEA has implemented a special sub-programme on Nuclear Knowledge Management (NKM). The focus of the sub-programme is on the development of guidelines for NKM, on networking the nuclear community, nuclear education and training to help the preservation of nuclear knowledge (IAEA, 2007). The programme at the IAEA in the past was mainly focused on the activities related to nuclear knowledge management issues on a broader scale; however in the future the need will occur to have more and more efforts focused on guidelines and approaches that not only deal with nuclear knowledge as an asset to be preserved and enhanced but rather created and shared among nuclear workers.

This paper will next look at the efforts to apply knowledge management approaches at nuclear facilities, but possibly also apply such approaches

when dealing with knowledge internal to the IAEA. The inspectorate at the IAEA headquarters can also benefit from ideas for implementing an enterprise wide nuclear knowledge management system. The study will look at one simplified business process executed by the inspectors during inspection and how the PROMOTE approach can introduce efficiency and quality in dealing with daily nuclear related activities and emergency situations as they occur. The benefits of knowledge management are thought to be not only related to preserving nuclear knowledge but also bringing productivity and effectiveness to work performed on a daily basis by nuclear workers. The same is also true for safeguards nuclear inspectors who periodically perform verification activities at nuclear facilities, and whose activities can be supported by a knowledge management system accessible on-site, from facilities as well as from the IAEA headquarters.

Rather than having a bottom-up approach to nuclear knowledge management, as is often the case with knowledge management systems in industry, the PROMOTE approach suggests that daily work is embedded into a knowledge management system. Instead of knowledge management system being based on a technology solution that puts a constraint also in terms of the way work is performed, rather start studying the business processes and work down the knowledge structures all the way to the existing, as well as new technologies made available for providing knowledge management services. Knowledge sharing may not be possible to impose by transforming tacit knowledge to explicit with the use of databases or documents. Encapsulated understanding of both data and processes as and when executed encourages knowledge sharing and its creation. Exchange of nuclear knowledge and creation of knowledge captured at the level of process execution will elevate its benefits to an overall nuclear knowledge management system at facilities and elsewhere.

The next section of the paper will summarize the suggested PROMOTE approach developed as a part of an EU project at the University of Vienna. [IST-1999-11658]

PROMOTE Approach

Service-based Enterprise Knowledge Management System

The PROMOTE approach defines the implementation of Services–Based Process-Oriented Enterprise Knowledge Management System (E-KMS). It was developed as a part of a European Community founded project. It defines a modelling language that is used to analyse, document and implement an E-KMS on the basis on the so called Knowledge Management Processes (KMPs).

Figure 1

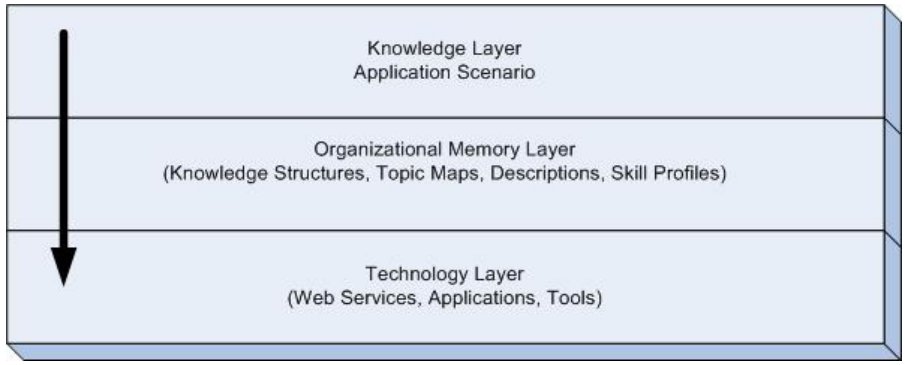

Figure 1 depicts the three layers of an Enterprise Knowledge Management System. This defines the overall PROMOTE framework. A top-down approach is suggested.

The framework suggested by the PROMOTE approach consists of three layers (Karagiannis and Woitsch, 2001).

- **Knowledge Layer:** represents the application scenario layer of an E-KMS. This layer is very much defined by the strategic decision and the knowledge management strategy of an entity. By selecting the right scenario and the focus of the E-KMS the effectiveness of such knowledge systems is determined**.** It represents the top layer of the three layered architecture where knowledge management approaches find usefulness and bring benefits.
- **Organizational Memory Layer:** Conceptually represents the Organizational Memory (OM). This constitutes the cognitive

structures and information proceeding processes**.** It is not only the stored data aggregated over the years from which conclusions can be drawn but also the related processes that make use of this data (Technische Universität Chemnitz, 2006). To describe cognitive structures, models such as ontologies and topic maps are used to depict the static view of the organizational memory. PROMOTE offers a modelling language which includes both static view of topic maps and a dynamic view of so called Knowledge Management Processes (KMPs). With this new approach KM models can be embedded into already existing working environment, business process and resource models**.**

- **Technological Layer:** is where the service based architecture is enabled through information technology (IT). The PROMOTE approach defines categories of knowledge activities to enable such a services based architecture. The aim is to integrate Knowledge Management Services (KM-Services) provided by various tools and use PROMOTE models to integrate these. PROMOTE can be seen as a knowledge based application integration platform managed by models. KM- Services can be seen as a semantic description for categorizing the functionality of the E-KMS. The range of services is not limited to IT-Services and this layer addresses both, the IT based KM-Services such as search engines, documents management systems as well as social-based KM-Services including face-to-face communications or coffee corners.

The PROMOTE Methodology

PROMOTE methodology suggests a phased approach for implementing a service-based process-oriented E-KMS in an organization. It is a structured approach which requires defining the business case and answering basic questions as to what the benefits of such as system will be (Karagiannis and Woitsch, 2001).

- **Phase 1 - Aware your Enterprise Knowledge** tries to answer the question “why implement knowledge management” This is the first step in setting up a knowledge management system and is rather critical in achieving the organizational objectives. Decisions at this stage are strategic and should be aligned with the overall organizational strategy on knowledge management.

- **Phase 2 – Discover Knowledge Processes** is specifically concerned with how E-KMS can support the business objectives. Although KM is an interdisciplinary approach, this method is a process based method. Business processes are studied by focusing the efforts to certain business areas.
- **Phase 3 – Modelling KMPs and OM** represents the step where business processes are modelled, analyzed and where knowledge intensive tasks are identified. Activities for which "an explicit control of knowledge" leads to gaining better performance on the business processes. Through the so called Knowledge Structure Models the dynamic and the static aspects are modelled for categorizing knowledge resources and corresponding access rights.
- **Phase 4 – Making the KMP and OM operational** is the stage where an E-KMS is realized by combining IT-based and non-IT-based KM Services. The challenge of PROMOTE is to integrate heterogeneous tools with the use of models. Tools are seen as functionalities interpreted as KM-Services. Components of PROMOTE are seen as proxy-containers of KM-Services of KM functionalities of various tools.
- **Phase 5 – Evaluate your Enterprise Knowledge** which represents a phase where the benefits of E-KMS are assessed. Under the PROMOTE approach this is possible through the use of Balanced Scorecards, provided by interfacing ADO score. (BOC-Group, 2007)

In summary, the PROMOTE approach follows a common and intuitive development cycle based on well defined objectives. These objectives are aligned with the overall strategy and can be aimed at generating efficiency, productivity or quality. Through models of business processes and the underlying cognitive structures KM-Services can be used. In other words using any relevant IT or non-IT functionality serving as a knowledge resource. In the next section of the paper use of the PROMOTE approach as a contributor to Knowledge Management at nuclear facilities will be discussed.

PROMOTE Approach in Nuclear Facilities

As it was mentioned previously, PROMOTE uses a process oriented approach for establishing a service based knowledge management system. Under the process oriented approach a process can be seen as content, as a

starting point and integration platform, and as a management instrument. (Woitsch, 2005)

Application Scenario (Interim Inventory Verification-IIV)

The application scenario which constitutes the top layer of the three-layered framework is the starting point of this approach. An example of an application scenario is the Interim Inventory Verification (IIV) business process. This is one of the critical activities of nuclear inspectors performed at nuclear facilities and can be equally important to national inspectorates or facility operators. By using a top-down approach business processes will first be identified, leading to the identification of Knowledge Intensive Tasks (KITs).

IIV is an activity commonly executed on a monthly basis for a specified Cut-Off-Time (CoT). The volumes of the solutions in vessels are verified using solution measurement systems. Furthermore samples are taken according to a random sampling plan based on material strata, for destructive analysis. Prior to performing the IIV, operators provide the inspectors with preliminary declarations on the activity of the plant. Using different data measurement systems, surveillance systems and results from sample analysis, the inspectors verify their findings against the provided operator declarations. This is an example of a process which may vary from one facility to another depending on the type of the facility and the defined criteria of the Safeguards approach. (IAEA, 2005)

PROMOTE Business Process Model (IIV)

The first step is to model the business process, namely the IIV. Figure 2 shows a snapshot of a business processes representing an inventory verification procedure. With the involvement of inspectors and the existing example IIV procedures, a simplified example of the IIV business process was depicted and subsequently the KITs were identified. What constitutes a KIT is an activity that requires knowledge exchange and for which they may be a lack of procedures or guidance on performing these activities. Actions taken are context sensitive and it may be difficult to efficiently resolve an emergency situation or an unknown situation. In the example shown three knowledge intensive tasks were identified:

1. **Investigate** – before any data generated by measurement systems can be used for verification, a check against the data collection and measurements systems needs to be performed. This task requires investigation of equipment which may require system specific knowledge more thought as a skill that technicians and equipment experts have. Inspectors dealing with dysfunctional equipment require knowledge which may not be explicitly documented or may require knowledge exchange with an expert.

2. **Clarify with Operator** – In case any inconsistencies are discovered during the comparison of the preliminary operator declarations and the inspector data such differences have to be clarified with the operator. Since this is an activity outside the procedural routine, inspectors need to be knowledgeable as to what questions to ask and what information to demand from the operators. Furthermore, they need to understand the implications of the differences and any subsequent actions they need to take.

3. **Evaluate Results** – After receiving the final operator declaration and all the results of the inventory verification are reviewed, the outcome is discussed with the operator. This is an activity that requires knowledge in evaluating the outcome based on previous IIVs and knowledge of the nuclear process that has taken place between two consecutive IIVs.

Figure 2

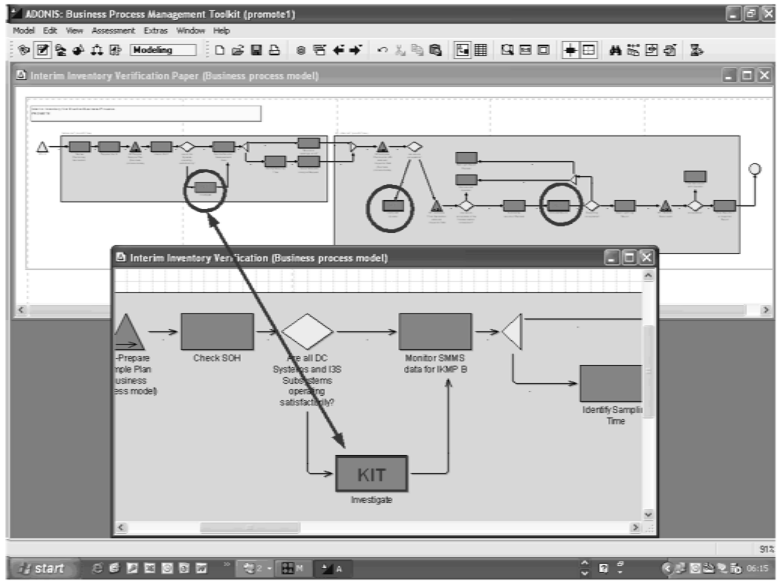

Figure 2 depicts the PROMOTE modelling environment with the business processes and the three KITs identified. The bottom window shows an enlarged portion of the business process model of the first KIT identified, namely "Investigate".

PROMOTE Knowledge Models (IIV)

The identified KITs only exemplify the identification of activities that are knowledge intensive and that require further analysis. They potentially may have a negative effect on efficiency and quality of executing the IIV business process. They represent the entry points to other models depicting organizational memory through static and dynamic knowledge models.

Once the business process model is complete, through the identified knowledge tasks PROMOTE modelling language references knowledge models, which define the exchange of knowledge, namely KMPs and weakly structured processes, Knowledge Processes (KPs) that such tasks consist of. In order to describe the organizational memory pertaining to the identified knowledge intensive tasks, static and dynamic models are used. Static models include "Knowledge Structure Models", "Topic Maps", or "Skills Models". The dynamic models that complete an organizational memory are

the KMP processes. A typical knowledge management process would be "Process-Oriented Search in the Internet", or "Process-Oriented Maintenance of a Thesaurus".

Knowledge Activities (K-Activities) describe which tasks in a Knowledge Management Process model are to be executed. The level of granularity at which activities are described can vary according to the requirements of the modeller. Provided that the exchange of knowledge will contribute to the understanding of the emergency or unknown situation, identified as KITs, KMP models need to be designed at the required granularity. Taking the example of the first KIT in our case study, namely “Investigate” the state-of-health of various measurement systems refers to static models depicting the map of the facility and the physical location of equipment taking measurements related to the nuclear processing. K-Activities referring to knowledge resources, tools and static models using knowledge as an input in the given example would allow the inspector to search in process-oriented manner for information related to the equipment and the IAEA experts to be contacted in an emergency situation. The Figure below shows example knowledge models including a knowledge structure model, skills profile model, tools and knowledge resources. Dynamic models are applied with the use of KMPs. In the organizational memory layer there are also the KM-Services interfacing the technological layer possibly consisting of web services and other knowledge resources. KM-Services are integrated with the use of Knowledge Management Processes (KMPs).

Figure 3

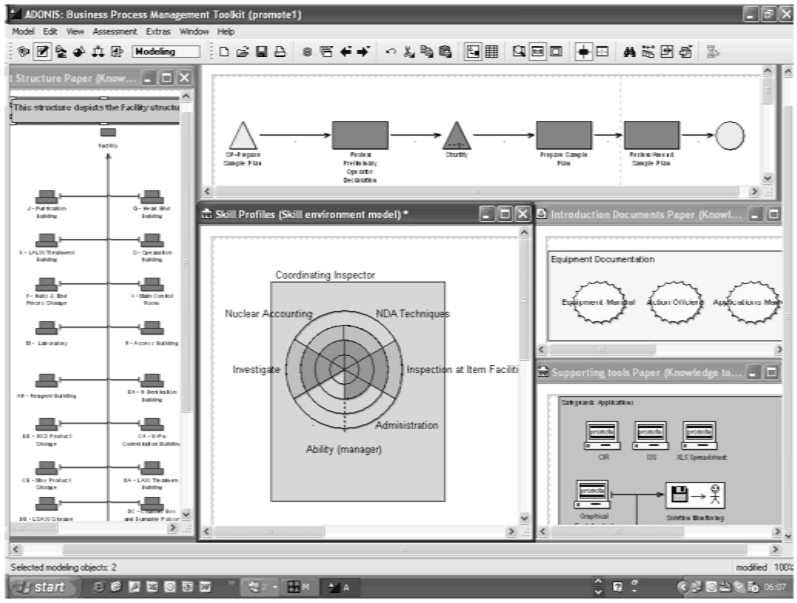

Figure 3 shows example static and dynamic models referenced in defining and executing knowledge management processes.

PROMOTE KM-Services (IIV)

To achieve the technical realization of a model based on the E-KMS the static models are used to represent the index of the organizational memory whereas the dynamic aspect describes the integration of different KM services using KMPs. Knowledge resources are accessed vie KM-Services and a K-Activity may use one or many KM-Services combined into a meta service. Using the example of IIV, one of the knowledge activities of "Evaluating Results" could be executed by a meta-search of all IIV results from the past and computerized inspection reports stored in a database. These KM Services integrate not only heterogeneous technology but can make use of existing documents or information products generated by another process.

The modelling language allows further configuration and maintenance of each of the modelling objects. It also allows for selective access to different resources based on predefined access levels. Cost estimates related to the execution of any of the activities can be configured in order to simulate the cost of various processes and therefore identify any cost saving opportunities.

Figure 4

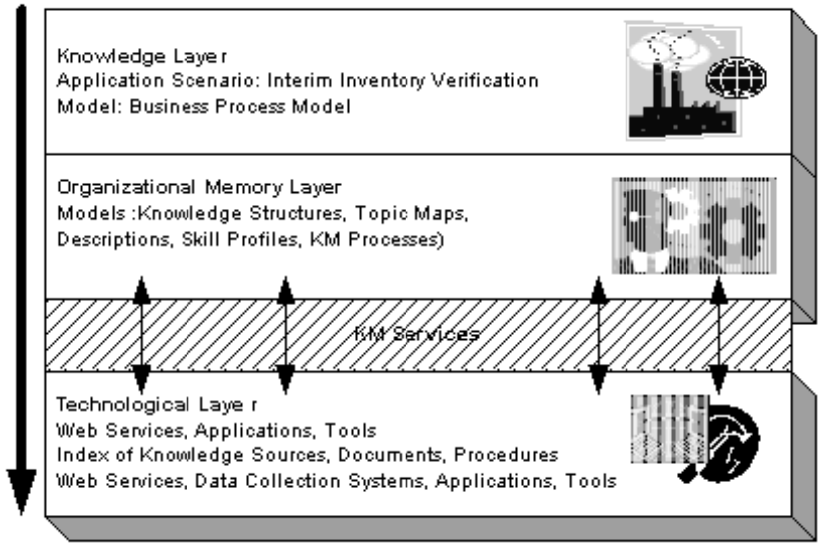

Figure 4 depicts the PROMOTE three layer framework applied for the IIV business process taking place at a Nuclear Facility.

From the above example application scenario the same approach can be applied to other business processes at Nuclear Facilities. Based on the interviews with inspectors and the received feedback, best knowledge models best support the description of knowledge intensive tasks. For the second identified KIT namely, "Discuss the differences with the facility operator", inspectors in some cases would simply require information from the previous IIVs in order to derive differences. With the use of models such as knowledge skills, the profiles of shift and coordinating inspectors are references in order to answer the questions who to contact when discussing IIV with the operator. Skills models entail the profile of the inspector depending on whether they are experts in particular equipment or perhaps more experienced in dealing with a particular problem. Information products generated by other referenced applications can bring clarity and

understanding of a particular situation and therefore overall efficiency to the process. PROMOTE models can be thought of as advanced reference models which through visual representations provide knowledge workers with information products in a process-oriented way. It embeds the KM-Services independent of the technological platform these were implemented. This means while performing the job clarity is brought to the process and its exceptions. PROMOTE offers a web interface enabling access from anywhere for all its users with drill down capabilities starting from business processes to its subsequent knowledge models while tapping into the information systems infrastructure of an enterprise.

Conclusion

PROMOTE is an effective approach in establishing a process-oriented service-based E-KMS for activities taking place in nuclear facilities. It applies a unique approach by being process oriented and therefore having the business process as a starting point. Most importantly also the approach encourages a clear application scenario which drives the development of an E-KMS. On the other hand application scenarios are driven by organizational strategic decisions on knowledge management. The approach mandates the continuous user involvement, which is a key factor in the development of any system. The service-based methodology is tool independent offering additional flexibility due to the dynamic change of technology.

As shown in the simplified examples the approach can be applied also for a Nuclear Knowledge Management System whether used at a facility or elsewhere by nuclear workers. Continuous improvement in managing and creating knowledge as an approach embedded in the daily work of nuclear workers may bring benefits to the overall nuclear industry. Through incremental integration of other application scenarios in an enterprise, creating a process-oriented Nuclear Enterprise KMS will be the next challenge.

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The heterogeneous equilibrium of Al(III) ion with aspartic acid and asparagine

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Abstract

This paper examines the precipitation of Al (III) ion in water solutions of $AlCl_3$ (10 mM, 5 mM and 3 mM) with aspartic acid and asparagines (100 mM, 10 mM and 1 mM) in constant ionic strength of 0,6 M NaCl. In this region of concentrations clearer solutions are found, and also where the solid phase is presented is determined. The solid phase is analyzed by means of elementary chemical analysis, IR spectroscopy and x-ray diffraction. The isolated compounds are:

Al(III) – Aspartic acid $Al_4(OH)_8[OOCCHNH_2CH_2COO]_2 \cdot 4H_2O$

Al(III) – asparagines $Al_4(OH)_{11}(OOCCHNH_2CH_2CONH_2)$

The product of solvability of isolated compounds can be approximately calculated in the solid phases, which is of great importance to better understand the distribution of aluminium in earth and in water with reference to the environment

Abstrakt

Në këtë punim është hulumtuar precipitimi i jonit të Al (III) nga tretësirat ujore të $AlCl_3$ (10 mM, 5 mM dhe 3 mM) me acid aspartik dhe asparaginë (100 mM, 10 mM dhe 1 mM) në forcë jonike konstante 0,6M NaCl. Është përcaktuar regjioni i përqëndrimeve ku janë gjetur tretësirat e kthjellëta dhe ku paraqitet faza e ngurtë. Faza e ngurtë është analizuar me analizë kimike elementare, analizë rentgenografike dhe spektroskopi IK. Janë izoluar këto komponime:

Al(III) – acid aspartik $Al_4(OH)_8[OOCCHNH_2CH_2COO]_2 \cdot 4H_2O$

Al(III) – asparaginë $Al_4(OH)_{11}(OOCCHNH_2CH_2CONH_2)$

Nga fazat e ngurta mund të llogaritet përafërsisht produkti i tretshmërisë së komponimeve të izoluara, që ka rëndësi për të kuptuar më mirë distribuimin e aluminit në tokë dhe në ujëra.

Abstrakt

Vo ovoj trud e istra`uvano precipitacija na Al (III) joni od vodeni rastvori na $AlCl_3$ (10 mM, 5 mM i 3 mM) so aspraginska kiselina i asparagin (100 mM, 10 mM i 1 mM) vo konstantna jonska sila od 0,6M NaCl. Odredeni se i granicite na koncentraciite kade se najdeni bistri rastvorii kade se pojavuva cvrsta faza. Cvrstata faza e analizirano so elementarna hemiska analiza, rendgenska analiza i IR spektroskopija. Izolirani se ovie soedinenia:

Al(III) – asparaginska kiselina $Al_4(OH)_8[OOCCHNH_2CH_2COO]_2 \cdot 4H_2O$

Al(III) – asparagin $Al_4(OH)_{11}(OOCCHNH_2CH_2CONH_2)$

Od cvrstata faza mo`e pribli`no da se ra~una proizvodot na rastvorlivosta na izoliranite soedinenia, {to je mnogu va`no da se podobro svati distribucija na aluminot vo po`va i vo voda.

Introduction

Aluminium is the third most abundant element and the most common metal in the earth's crust, comprising about 8% of the lithosphere (Lide 1997). Its concentration in soils varies widely, ranging from about 0.07 percent by weight or 700 mg/kg (ppm) to over 10 percent by weight or 100,000 mg/kg (ppm) (Shacklette and Boerngen 1984; Sorenson et al. 1974). During the last decades, with the impetuous development of industry and use in the industrialized part of the word of more fossil fuel containing sulphur, the increase of acidity in the surface water has become obvious. In different rocky regions, the above influences the growth of geochemical dispersion of aluminium and the concentration of Al(III) ion in natural water. Increased concentration of aluminium in water of rivers and lakes has indicated that the presence of the Al(III) ion causes damage to fish and other liuine creatures (Driscoll et al. 1988, 1990).

To have knowledge of characteristics of the Al(III) ion in water systems in necessary in order to examine the toxic character of aluminium and also to understand aluminium dispersal in land and in natural waters. Plenty of molecules and ions with organic and inorganic origin are located in natural waters. Cat-ions in natural waters can exist like complex compounds, meantime different an-ions in natural waters derive as a result of human activity (phosphates and carboxylic acids) or lie as natural matter (humus acids and amino-acids). The importance of organic ligands on aluminium complexion in natural water raised the interest of many researchers.

Aluminium concentration in soil and water

Data gleaned from texts and literature reviewed by soil scientists suggest a typical aluminium concentration in soil of 71,000 mg/kg (Frink 1996). Varying concentrations are found in different soil samples taken from the same area and in areas with different vegetation types (Brusewitz 1984; Sorenson et al. 1974). For example, in different soils of Missouri, aluminium concentrations ranged from 4,800 to 58,000 mg/kg (ppm) (USGS 1972). The aluminium content of soils is strongly correlated with its clay content. Aluminium levels in soil also vary with different vegetation types. For example, aluminium levels in the soils of coniferous forests are often higher than in soils of beach forests since coniferous forests tend to have more acid soils (Brusewitz 1984). The concentrations of dissolved aluminium in water

vary with pH and the humus-derived acid content of the water (Brusewitz 1984). Aluminium is only sparingly soluble in water between pH 6 and pH 8. Because pH of about 95% of naturally-occurring water is between 6 and 9 and since high aluminium concentrations occur in surface water bodies only when pH is < 5, the aluminium concentration in most natural waters is extremely low (Filipek et al. 1987; Snoeyink and Jenkins 1980; Sorenson et al.1974). Generally, aluminium concentrations in surface waters at pH levels above 5.5 will be< 0.1 mg/L (ppm) (Brusewitz 1984; Miller et al. 1984; Sorenson et al. 1974; Taylor and Symons 1984).

However, even at neutral pH levels, higher aluminium levels have been found in lakes with a high humus acid content (Brusewitz 1984). At lower pH levels, the aluminium content significantly increases because of increased solubility of aluminium oxide and salts in acidic solutions. In heavily contaminated surface waters in a mining region rich with sulphides, the water was highly acidic (pH <3.5) and the levels of soluble aluminium were greater than 2 mmol/L (50 mg/L) (Alvarez et al. 1993). Similarly, surface water samples contaminated with acidic mine drainage collected at seven different locations in the vicinity of abandoned coal mines in West-central Indiana had aluminium levels of 6.0 to 269 mg/L (Allen et al. 1996). The pH ranged from 2.1 to 3.4 at these sites.

Exposure to aluminium is inevitable due to its natural abundance in the earth's crust and its many uses. The intake of aluminium is mainly oral, and the major sources of human exposure to aluminium are drinking water, food residues, cooking utensils, food and beverage packaging, antacid formulations, and antiperspirant formulations (Marquis 1989). Aluminium is present in the human diet, in amounts varying from relatively low concentrations in animal products to relatively high concentrations in some processed foods. However, the gastrointestinal absorption of aluminium is low (<0.1%) and renal elimination is very effective in removing aluminium in healthy individuals (Muller et al. 1993b). Aluminium is inhaled from air primarily as alumino-silicates associated with airborne dust particles (Koo and Kaplan 1988). Since a large aqueous concentration of aluminium (i.e., >100 mg/L) can only occur when the pH is < 5 (Sorenson et al. 1974), the levels of aluminium in most natural waters (pH>6) are not expected to be of significant concern to human health. Miller et al.(1984) reported that the median aluminium levels in finished drinking water throughout the United States varied from 0.026 mg/L to 0.161 mg/L (ppm). More recently, (Schenck et al. 1989) reported concentrations of aluminium in finished drinking water in various regions of the United States were highly variable, ranging from undetectable to 1.029 mg/L (ppm). The median aluminium

concentrations in drinking water from 346 surface water and 35 groundwater sources were 0.06 and 0.02 mg/L, respectively. A correlation between aluminium and sulphate, Mn, and pH were ascribed to the effects of acid precipitation.

Materials and methods

To prepare solutions these substance are used: $AlCl_3$, aspartic acid and asparagines, NaCl, NaOH and the buffer solutions. Concentrated solutions are kept in dish glasses at room temperature; meantime watered solutions are prepared fresh for each series of precipitate systems. The preparation of precipitate systems is based on Tezhak's method (Tezhak et al.1951). To determine the precipitation diagram of Al (III) ion with concentration $1 \cdot 10^{-2}$ M and the changeable concentration of aspartic acid and asparagines, various series are prepared. It goes also for Al (III) ion with concentration $5 \cdot 10^{-3}$ M and $3 \cdot 10^{-3}$ M. Amino-acids concentration varies from $1 \cdot 10^{-1}$ M to $1 \cdot 10^{-3}$ M measure for each Al(III) ion concentration. To all series, on one hand, is added NaCl in order for the general ionic strength to be 0,6 M and on the other hand, NaOH solution to increase pH value gradually. The precipitation systems are thermostatted at $25^{o}C$ for 24 hours. Afterwards precipitation systems are examined to prove precipitation border between solid phase and the clear solution, then the pH value is measured beyond the precipitation. Samples in characteristic points of precipitation diagram are prepared for analysis in larger quantities. Later filtration gets inexpressive with 96 % ethyl alcohol (to eliminate Cl^-) and dried.

For these precipitations we recorded the infrared spectrum;, they are verified by means of roentgenographic diffraction and analysis is done for C, H and N, whereas the quantity of aluminium is measured by means of gravimetric analysis. Later, based on complete data, gross formula is proposed for every isolate compound.

Results and discussion

Analysis of solid phase Al (III) – aspartic acid

Precipitation of Al (III) ion with aspartic acid is examined to get the concentration of Al (III) ion $1\cdot10^{-2}$ M; $5\cdot10^{-3}$ M and $3\cdot10^{-3}$ M, and concentration of aspartic acid $1\cdot10^{-1}$M - $1\cdot10^{-3}$ M. From the precipitation diagram of Al (III) ion $1\cdot10^{-2}$ M with aspartic acid $1\cdot10^{-1}$ M -$1\cdot10^{-3}$ M (fig.1) we can see that the concentration of Al (III) ion $1\cdot10^{-2}$ M and concentration of aspartic acid $1\cdot10^{-1}$ M, precipitates down in pH = 4.58. If the concentration of aspartic acid lessens under $1\cdot10^{-2}$ M respectively $1\cdot10^{-3}$M, the precipitation starts to drag down even lower pH value (4.35 respectively 4.44).

The precipitation is used for the analysis of solid phase. After the precipitation has been prepared in quantity and dried up, necessary chemical analysis has been done such as infra- red spectroscopy, elementary analysis and roentgenogram. By the complete data introduced to table 1, gross formula of aluminium compound with aspartic acid is proposed ,which is synthesized from sampling with this content:(Al, L, pH);($1\cdot10^{-2}$M, $1\cdot10^{-1}$M, 5.08).

Table 1: Analytical data of solid phase in $AlCl_3$ – aspartic acid system-NaCl 0,6M-NaOH

Proposed formula	Findings				Computed				Loss during calcinations
	%Al	%C	%H	%N	%Al	%C	%H	%N	
$Al_4(OH)_8L_2\cdot4H_2O$	17.88	15.87	4.26	4.60	18.68	16.60	4.49	4.84	66.21%
L = aspartic acid, $HOOCCHNH_2CH_2COOH$									

The infrared spectrum of compound $Al_4(OH)_8[OOCCHNH_2CH_2COO]_2\cdot4H_2O$ differentiates from the infrared spectrum of pure aspartic acid (fig. 2; 3). Main peak of carbonyl groups at pure aspartic acid is found in 1690 cm^{-1}, whereas the coordinated compound with aluminium this peak is conveyed in lower value of wave numbers (1619 cm^{-1}), that signifies incoming to

coordinate with COOH groups of aspartic acid (Gross 1985). Roentgenogram of $Al_4(OH)_8[OOCCHNH_2CH_2COO]_2 \cdot 4H_2O$ compound signifies that this compound is amorphous.

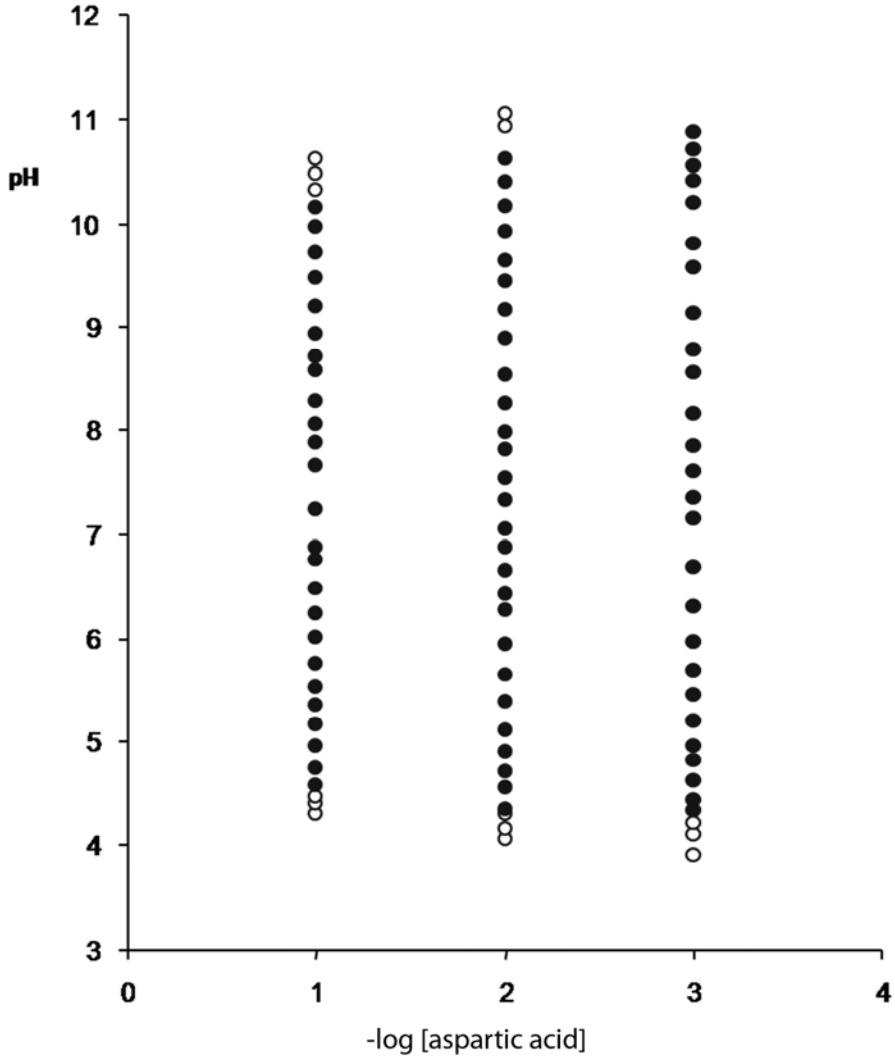

Figure 1: The precipitation diagram of $AlCl_3 = 1 \cdot 10^{-2}$ M with aspartic acid

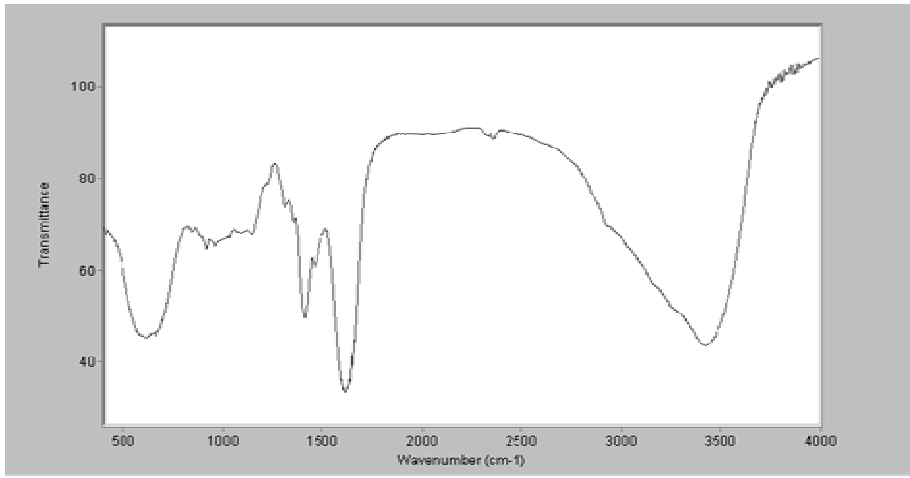

Figure 2: Infrared spectrum of $Al_4(OH)_8[OOCCHNH_2CH_2COO]_2 \cdot 4H_2O$

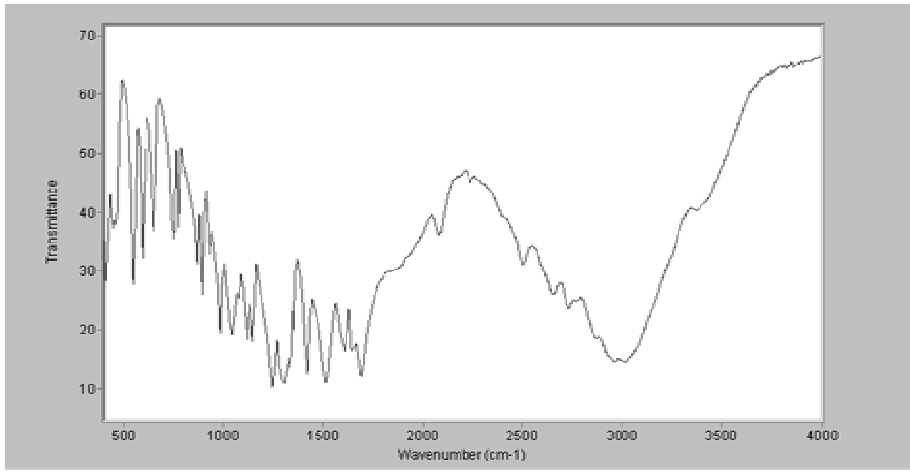

Figure 3. Infrared spectrum of aspartic acid

Analysis of solid phase Al (III) – asparagines

Precipitation of Al (III) ion with asparagines was examined with concentration of Al (III) ion $1 \cdot 10^{-2}$ M; $5 \cdot 10^{-3}$ M and $3 \cdot 10^{-3}$ M and various concentrations of asparagines $1 \cdot 10^{-1}$ M $-1 \cdot 10^{-3}$ M, by adding NaCl solution in order for the general ionic strength to be 0.6 M and various concentrations

of NaOH and HCl solution to adjust the pH value. From precipitation diagram of Al (III) ion with asparagines (fig.4) we can see that in concentration $1 \cdot 10^{-2}$ M of Al (III) ion and in concentration of asparagines $1 \cdot 10^{-1}$ M, the precipitation begins in pH= 4,81. If the concentration of asparagines in lower value, respectively $1 \cdot 10^{-2}$ M; respectively $1 \cdot 10^{-3}$M, precipitation begins in lower value (4.64 respectively 4.62).

To analyze solid phase, sampling quantity of solid phase is prepared and after drying up, necessary chemical analysis, infra red and elementary analysis have been done. By complete ratings which are introduced in table 2, gross formula of Al(III) compound with asparagines is proposed with this content:(Al, L, pH); ($1 \cdot 10^{-2}$ M , $1 \cdot 10^{-1}$ M, 5,70).

Table 2: Analytical data of solid phase in $AlCl_3$ – asparagines – NaCl 0.6 M – NaOH

Proposed formula	Findings				Computed				Loss during calcinations
	%Al	%C	%H	%N	%Al	%C	%H	%N	
$Al_4(OH)_{11}L$	24.32	10.77	4.07	6.20	25.35	11.26	4.22	6.57	55.24%
L = asparagines, $HOOCCHNH_2CH_2CONH_2$									

Infrared spectrum of $Al_4(OH)_{11}[OOCCHNH_2CH_2CONH_2]$ differentiates from infrared spectrum of pure asparagines (fig. 5; 6). Main peak at carbonyl group (C=O) at pure asparagines is found in 1682 cm^{-1}, whereas the coordinated compound with aluminium this peak is conveyed in lower value of wave numbers (1650 and 1634 cm^{-1}), that it has came to the coordination of COOH groups of asparagines with aluminium (Gross 1985).

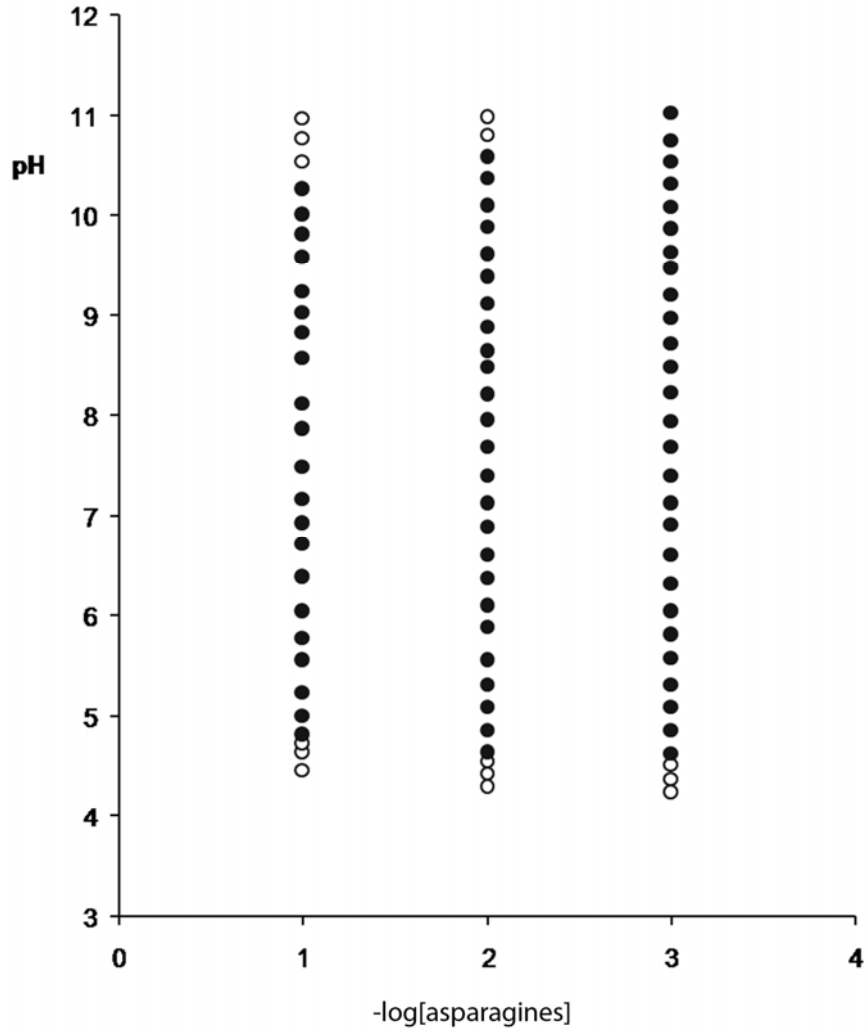

Figure 4: The precipitation diagram of $AlCl_3 = 1 \cdot 10^{-2}$ M with asparagines

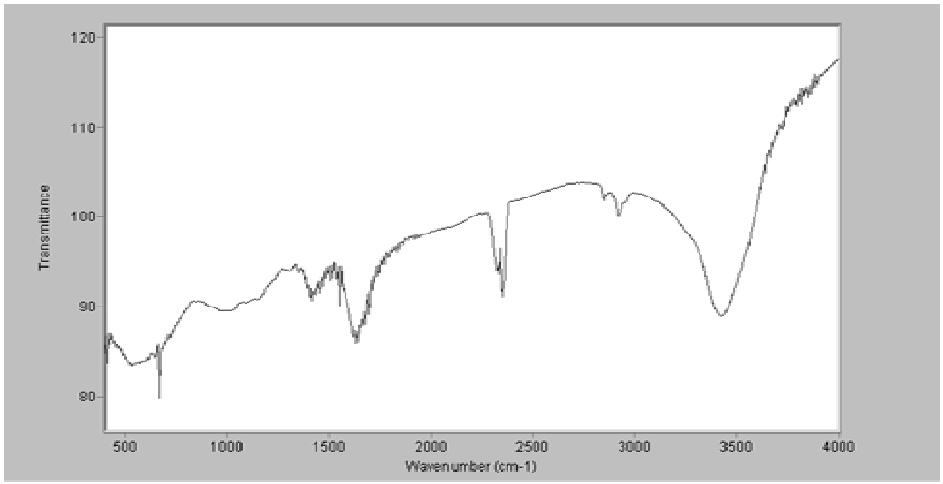

Figure 5: Infrared spectrum of $Al_4(OH)_{11}[OOCCHNH_2CH_2CONH_2]$ compound

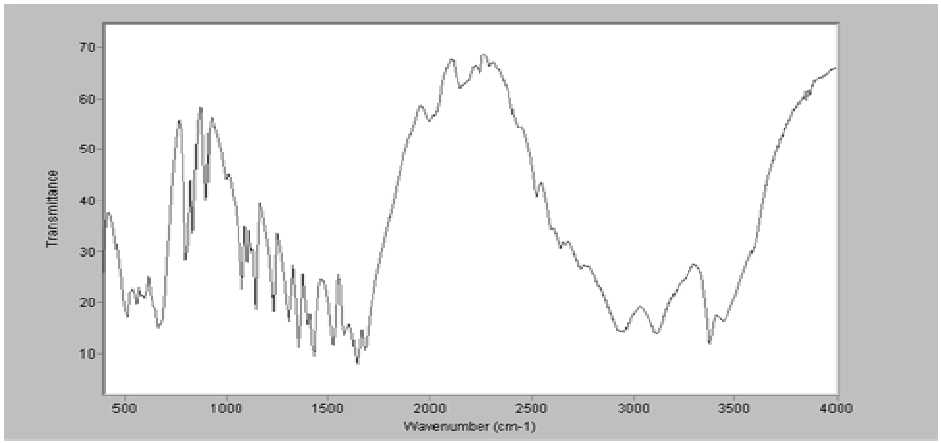

Figure 6: Infra red spectrum of asparagines

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Genus *Galinsoga* Ruiz & Pavon (*Asteraceae*) in Macedonian flora

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Abstract

The genus *Galinsoga* Ruiz & Pavon, in the Macedonian territory, according to current data, is represented with the unique species *Galinsoga parviflora* Cav. While researching the genus, *Galinsoga*, in Macedonia, a new species of this genus *Galinsoga ciliata* (Raf.) S.F. Blake, was discovered, which represents a new record for Macedonian flora.

Abstrakt

Gjinia *Galinsoga* Ruiz & Pavon në territorin e Maqedonisë, duke u bazuar në të dhënat ekzistuese përfaqësohet me llojet unike *Galinsoga parviflora* Cav. Gjatë hulumtimit të gjinisë, Galinsoga në Maqedoni, u zbuluan *Galinsoga ciliata* (Raf.) S.F. Blake, lloje të reja të kësaj gjinie, gjë që paraqet një të arritur në florën maqedonase.

Apstrakt

Родот *Galinsoga* Ruiz & Pavon, во македонската територија , според последните податоци е претставен со уникатните видови *Galinsoga parviflora* Cav. Додека го истражуваваме родот *Galinsoga*,во Македонија, беа откриени нови видови на овој род *Galinsoga ciliata* (Raf.) S.F. Blake, и тоа преставува ново име за македонаската флора.

Introduction

The genus *Galinsoga* Ruiz & Pavon is an small genus with two species: *Galinsoga parviflora* Cav. and *Galinsoga ciliata* (Raf.) S.F. Blake [10,1,5,11,6]. *Galinsoga* Ruiz & Pavon originates in South America's Peruvian Andes. It was brought to Europe in 1794, when samples of this plant were brought to Madrid, Paris botanical gardens and other parts of Europe. It began to spread broadly, naturalizing easily as a spontaneous plant. It is known as a bad grass in agricultural products and it is distinguishable by its high vitality. It is very difficult to eliminate. In Macedonia it is represented with the unique species *Galinsoga parviflora* Cav. During the research of this genus in Macedonia, another new species of *Galinsoga* Ruiz & Pavon, *Galinsoga ciliata* (Raf.) S.F. Blake, was discovered which represents a new record for Macedonian flora.

Materials and Methods

The research and the description of this plant material is based on the morphological features of the genus *Galinsoga* [10,3,8,7,6]. General morphological descriptions of the species are made as well as comparative descriptions of their features are presented in Table 1. For the sake of full transparency, original photos of both species, showing a general view of the plants as well as specific details relevant to their determination.

Results and Discussion

Galinsoga parviflora Cav., (Figure 1) is an annual grassy plant which grows up to 50 cm with a branched and hairless stem. It has simple, narrow, elliptic hairless leaves, located on opposite sides of the stem. It has small capitula, 5 mm in diameter, with weltered bracts up to 4 mm, elliptic in shape, and located in two rows. The conical involucrum has two kinds of florets. The female lingulate florets, have tongues around 1mm, almost as wide as long they are. They have 3-5 white teeth. It has central florets, which are yellow, hermaphrodite, tubular florets. Achene's 1–1, 5 mm, obovoid up to prismatic, with short upwards aristatae (crests) and scaled pappus (not needled).

Figure 1. Galinsoga parviflora Cav., general view of the plant, September 2006 (photo by Haziri A).

Galinsoga ciliata (Raf.) S.F. Blake, Rhodora 24:35(1922). Synonym: *Galinsoga quadriradiata* auct., non Ruiz & Pavon. Figure 2. Examined specimens: Macedonia: Upper part of the Polog valley: 546 m, 41º 48' N, 20º 55' E, 14 September 2006, A. Haziri and F. Millaku. Figure 3. Is an annual herb which grows up to 60 cm with a branched stem (pedicle) which is dense and covered with glandular hair. The first leaves are oval, a little toothed and the leaves are on opposite sides of the stem. The oval leaves mature up to triangular, margine dentale, and are covered with dense hair, especially at the lips of lappet. The subspherical capitula, grow up to 7 mm, and have involucrum with internal and external bracts. Receptacle conical, with scales. Peripheral, white, female ligulate florets, 4-6 in quantity, have a triple tongue. It has central tubular florets, which are yellow, hermaphrodite, 15-30 in quantity. The pappus-scales aristate. Achenes, obovoid-prismatic, brown to black, are too many in quantity to count. A single plant can produce up to 7500 of these achenes. The cotyledons orbicular, 4-8 mm. Flowering June-October.

Identifying characteristics

Hairy stems and leaves, and 3-toothed ray flowers. The densely hairy nature of this weed helps to distinguish this weed from smallflower galinsoga (*Galinsoga parviflora* Cav.), which is very similar but much less hairy than *Galinsoga ciliata* (Raf.) S.F. Blake.

Figure 2. Galinsoga ciliata (Raf.) S.F. Blake, general view of the plant, September 2006 (photo by Haziri A).

***Galinsoga parviflora* Cav.**	***Galinsoga ciliata* (Raf.) S.F. Blake**
- Stem up to 50 cm - Hairless stem and leaves	- Stem up to 60 cm - Stem and leaves with glandular hair
- Narrow oval leaves	- Oval leaves wide and triangular
- Capitula up to 5 mm	- Capitula up to 7 mm
- Lingulate florets, as wide as long	- Lingulate florets, longer than wide

Table 1. Morphological differences among *Galinsoga* species in Macedonia.

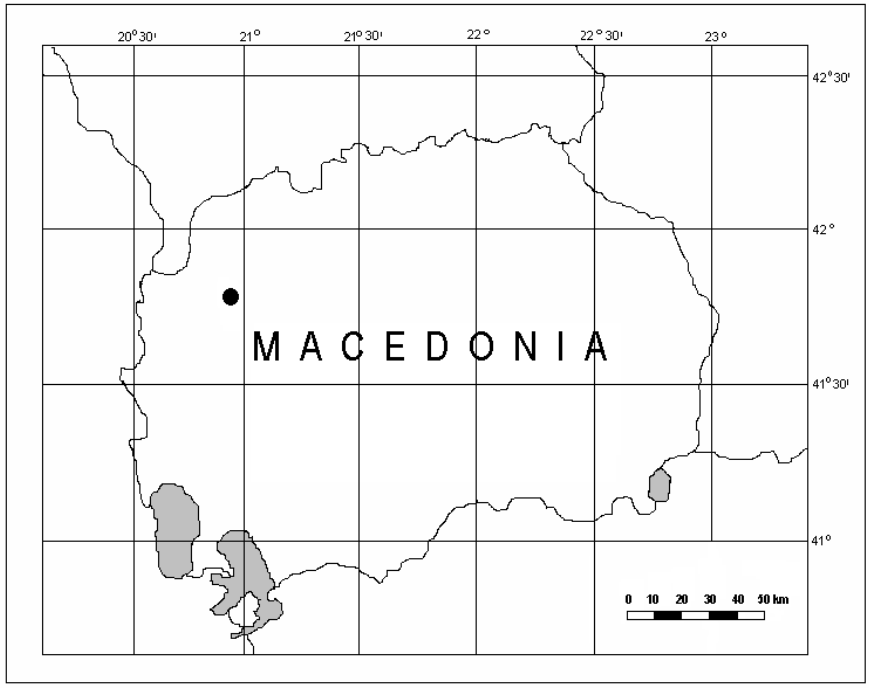

Figure 3. Distribution of Galinsoga ciliata (Raf.) S.F. Blake in Macedonia (•).

Based on what was said above, we can conclude that:

1. From the current knowledge of flora in Macedonia, the genus *Galinsoga* Ruiz & Pavon is represented with the unique species *Galinsoga parviflora* Cav.

2. As a result of the research of the genus *Galinsoga* in Macedonia, another new species of this genus, *Galinsoga ciliata* (Raf.) S.F. Blake, presents a new species for Macedonian flora.

3. According to published data, [4,9,2,11], the genus, *Galinsoga* Ruiz & Pavon, in Albanian flora is also represented with the unique species *Galinsoga parviflora* Cav., that is why the species

Galinsoga ciliata (Raf.) S.F. Blake, presents a new species not only for Macedonian flora but for the larger part of the Balkans as well.

Acknowledgements

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Quality projection of manufacturing processes relating to environmental protection

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Abstract

Within the implementation of the quality provision system according to ISO 9001 from 2000, technological processes are being projected through standard operating procedures in order to provide defined quality of products. The conservation of the environment it is of great importance in such a system, especially the disposal of sewage containing dangerous reactants. Also, by proper exploitation of both the reactants and energy, the required quality can be achieved having in mind also the economy of the process. By the implementation of a TQM approach as well as co-relational analysis as a mathematical method of quality projection of the manufacturing processes regarding the environment, the technological process of steel hardening becomes optimised by the use of the MATLAB programme, simultaneously having in mind the costs of working.

According to the technology, the steel hardening process is conducted within a temperature interval of 820-860°C, with 1-10% solution of sodium hydroxide (NaOH), and the normalisation of the steel is executed at a temperature of 600-610°C. By the application of co-relational analysis, the optimal values of the parameters of the steel hardening process are determined , i.e. a temperature of 820°C and NaOH concentration of 2.38%, which aids the achievement of the defined quality of steel firmness of 195

Brinel. Thus, both the loss of electricity and consumption of NaOH have been calculated on a yearly level, according to the hardening conditions which were implemented by now with the standard operating procedures in the factory.

The sum of the total savings regarding the hardening of 100,000 pieces of steel per year amounts to €18033. By the implementation of this method, the defined quality can be achieved with the lowest possible costs of work.

Apstrakt

Në praktikimin e sistemit për sigurim të cilësisë sipas ISO 9001 nga viti 2000, proceset teknologjike projektohen nëpërmjet procedurave operative standarde me qëllim që të sigurohet cilësia e definuar e prodhimeve. Në sistem të tillë, e patjetërsueshme është nevoja për mbrojtjen e ambientit jetësor, posaqërisht mënjanimi i ujrave të ndotur me reagensa të dëmshëm. Gjithashtu me përdorim të mirëfilltë të reagensëve dhe energjisë mund të arrihet cilësia e kërkuar duke pasur parasysh kursimin gjatë procesit.

Me zbatimin e TQM-së dhe analizës korelative si metodë matematikore për projektim të proceseve në funkcion të ambientit jetësor, avancohet procesi teknologjik i kalitjes të çelikut, me përdorim të MATLAB programit, gjithnjë duke pasur parasysh shpenzimet e punës.

Sipas teknologjisë, procesi i kalitjes realisht kryhet në interval temperature prej

820-860°C me 1-10% tretësirë të hidroksidit të natriumit (NaOH), ndërsa normalizimi i çelikut bëhet në temperaturë prej 600-610°C. Me zbatimin e analizës korelative janë përcaktuar vlerat optimale të parametrave në procesin e kalitjes të çelikut Ç1530, e kjo është në temperaturë prej 820 °C dhe koncentrim të NaOH prej 2.38 %, gjatë të cilës arrihet cilësia e definuar e fortësisë e çelikut prej 195 Brinel. Me këtë, janë llogaritur edhe humbjet e energjisë elektrike dhe shpenzimi i NaOH të bëra gjatë vitit, sipas kushteve të kalitjes të cilat janë praktikuar gjer më tani, sipas procedurave operative standarde të projektuara në fabrikë.

Për kalitjen e 100,000 copave çelik në vjet, kursimi i përgjithshëm arrin sumën prej

€18 033. Me zbatimin e kësaj metode mund të arrihet cilësia e definuar me shpenzime minimale gjatë punës.

Апстракт

Во практикувањето на системот за обезбедување квалитет по ИСО 9001 од 2000 - та година, технолошките процеси се проектираат преку стандардни оперативни процедури со цел да се обезбеди дефинираниот квалитет на производите. Во таков систем, неопходно е да се води сметка за заштита на животната средина, нарочно отстранувањето на отпадните води со штетни реагенси. Исто така, со правилно искористување на реагенсите и енергијата може да се постигне бараниот квалитет водејќи сметка за економичноста на процесот.

Со примена на ТЉМ пристапот и корелационата анализа како математички метод за проектирање на квалитетот на процесите во функција на животната средина, се оптимизира технолошкиот процес на калење на челик, користејќи ја програмата МАТЛАБ, притоа водејќи сметка за трошоците во работењето. Според технологијата, процесот калење реално се изведува во температурен интервал од 820-860°C, со 1-10 % раствор на натриумхидроксид (NaOX), а нормализирањето на челикот се врши на температура 600-610 °C. Со примена на корелационата анализа се утврдени оптималните вредности на параметрите на процесот калење на челик Ч1530 , а тоа е температура од 820°C и концентрација на NaOX од 2.38 %, при кои се постигнува дефинираниот квалитет на тврдоста на челикот од 195 по Бринел. Со тоа, се пресметани загубите во електрична енергија и потрошувачка на NaOX кои се прават годишно, според условите на калење кои досега се практикуваа со проектираните стандардни оперативни процедури во фабриката.

За калење на 100,000 парчиња челик годишно, вкупната заштеда по таа основа изнесува €18 033. Со примената на оваа метода може да се остварува дефинираниот квалитет при најмали трошоци во работењето.

Introduction

Every company, regardless of its size and function, presents a part of the environment – it both influences and changes the environment. The environment can differ in various aspects: chemical-technological, technical, economic, judicial, sociological-psychological, etc. Concern about the environment is becoming more and more real owing to the apparent endangerment of people, animals and plants. Therefore, companies must not limit themselves only to the most critical aspects of environmental degradation, but also they have to master completely environmental management and practice eco-protection systems as well. Environmental management should solve the contradictory gap which appears between the economic and the ecological requirements of the organisation.

ISO 14 000 standards allow companies to manage their influences over the environment, but how successful the implementation is depends on the understanding and support of the management team, as well as all the employees in the companies. ISO 9000 standards, which refer to a system of quality provision of companies, have been designed to protect customers from a low-class product or service. ISO 14 000 standards are complementary to them; their common goal is creation of quality processes and products for protection of the environment.

Basis of theory

Environmental management within companies

The basic thing that one company should do in regard to protection of the water, air and soil from pollution is determining a system for eco-management. Beside the measuring, registering and evaluation of pollution, it is of essential importance to have integrated and planned activities for protection and application of the environmental protection programme. The activities should also be aimed at:

- setting a cataster of pollutants with a revision of all emissions into air, water and soil by quantity and chemical compound, based on project values, counted data and measured values;

- identification and quantification of the eco-aspects and influences connected to the working process;
- re-engineering of the processes and treatment of waste;
- eco-construction of the products;
- conservation of resources by monitoring energy and material consumption;
- implementation of protection and improvement of the environment in all programmes for development;
- formation of a unique informative system on the environment;
- reinforcing the eco-awareness of the employees.

To realize these activities, the company's willingness to organize working processes with decreased negative influence on the surroundings by means of a consistent and documented system for eco-management is of great importance for the conservation of resources, by monitoring the energy and material consumption.

Quality projection of manufacturing processes regarding the environment

Concern for the environment must be present from the very beginning of quality projection of the manufacturing processes. At the same time, we should bear in mind not only the danger of pollution, but also the conservation of resources. All available resources should be taken into account while making the projection: the employees, raw materials, machines, energy, etc. This is important so that good quality at optimal conditions can be provided. (Cepujnoska & Cepujnoski, 1993a, 1993b). With this type of approach we can get good quality, more efficient work, eco-protection, all at the lowest possible cost.

The provision of projected quality should go according to Deming's circle of quality: Plan – Do – Check – Act (Deming, 2000), which puts the act of planning in first place, than provision of all conditions for realization of what is planned, followed by control of whether it has been realized. If not, corrective measures should be put in place in order to stop reoccurrence of the same mistake. In other words, the provision of quality requires proper, correct, expeditious realization of all activities of the projected quality of the manufacturing processes, as well as provision of suitable eco-conditions. Also, the tasks of all the employees should be clearly defined in a form of a matrix of obligations and responsibilities.

Quality control of the manufacturing process regarding the environment

The control of quality is a very necessary activity within eco-management. A quality control service is required to collaborate with the marketing and development function due to its participation in forming definitions of the standards for quality of products, fulfilling eco-requirements, defining the methods of measurement and evaluation of quality according to the needs of the customers and the conservation of resources.

This collaboration needs to be spread with the procurement function, for control of the incoming eco-materials as the first ramp of quality.

For successful control, the data output based on environmental facts should be rapid with pre-determined feedback mechanisms, so that corrective measures can be applied according to Deming's circle of quality (Chepujnoska & Chepujnoski, 1995, 1996; Gyma, 1998; Deming, 2000). Customers' claims for compensation should be analysed and systematised so that corrective measures and cost analysis can be applied, in order to conserve resources and to meet the requirements of ecology. To establish a proper system of control regarding the environment, education as well as training of employees for continuous care and concern about the environment is of great importance, as is the mastering of new techniques. This is a task of employees in the quality service which must introduce education for the issue of safety and environment, lectures, various types of training with instruments for testing of quality and eco-aspects. The control should provide expeditious, proper and correct measurement of eco-influences and draw objective evaluations about the condition. The collected data should be provided in adequate form, at the right time and place. An efficient control requires: selection of adequate people; selection of proper control-points; application of adequate statistical methods; and working with lowest possible costs.

The people should be selected according to their level of knowledge; willingness to master the methods of measuring eco-influences, the amount, intensity and durability of these influences, the causes of their appearance, the cost of changing them, reflection over other activities, etc. They should be responsible, able to co-operate, disciplined, able to work with facts and arguments and point out expeditiously the possible problems.

During the selection of the control places, it is important to note that only eco-aspects that influence the environment are measured. These are emission of air, water drainage, waste management, soil pollution, resources management, and influence on the community. Finding the right places where the eco-influences can be measured is very important.

By analysing the subordination of the control places and costs it becomes noticeable that by increasing control, costs increase too. Thus, an optimal control should be projected in order to meet the requirements of the environmental control system. It is desirable that the control is connected to the manufacturing processes as much as possible, due to the possibility of faster examination, provision of data on the eco-aspects and conducting corrective measures.

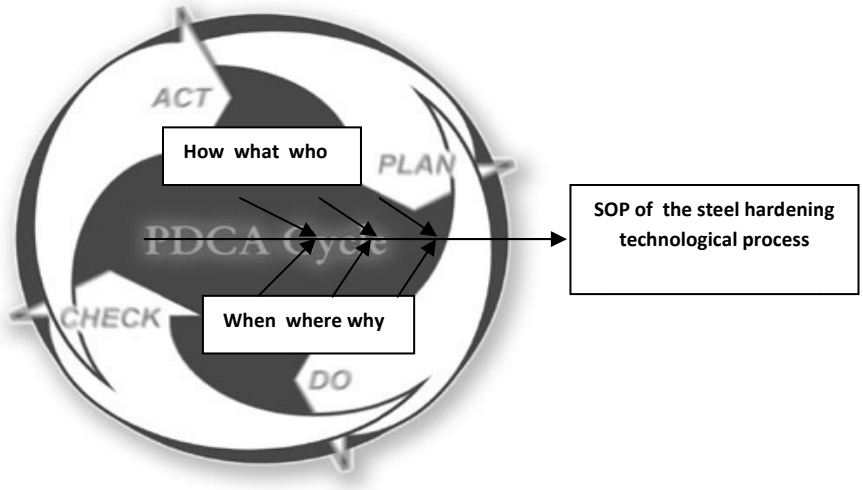
Application to practice

Quality projection of the technological process of steel hardening S1530

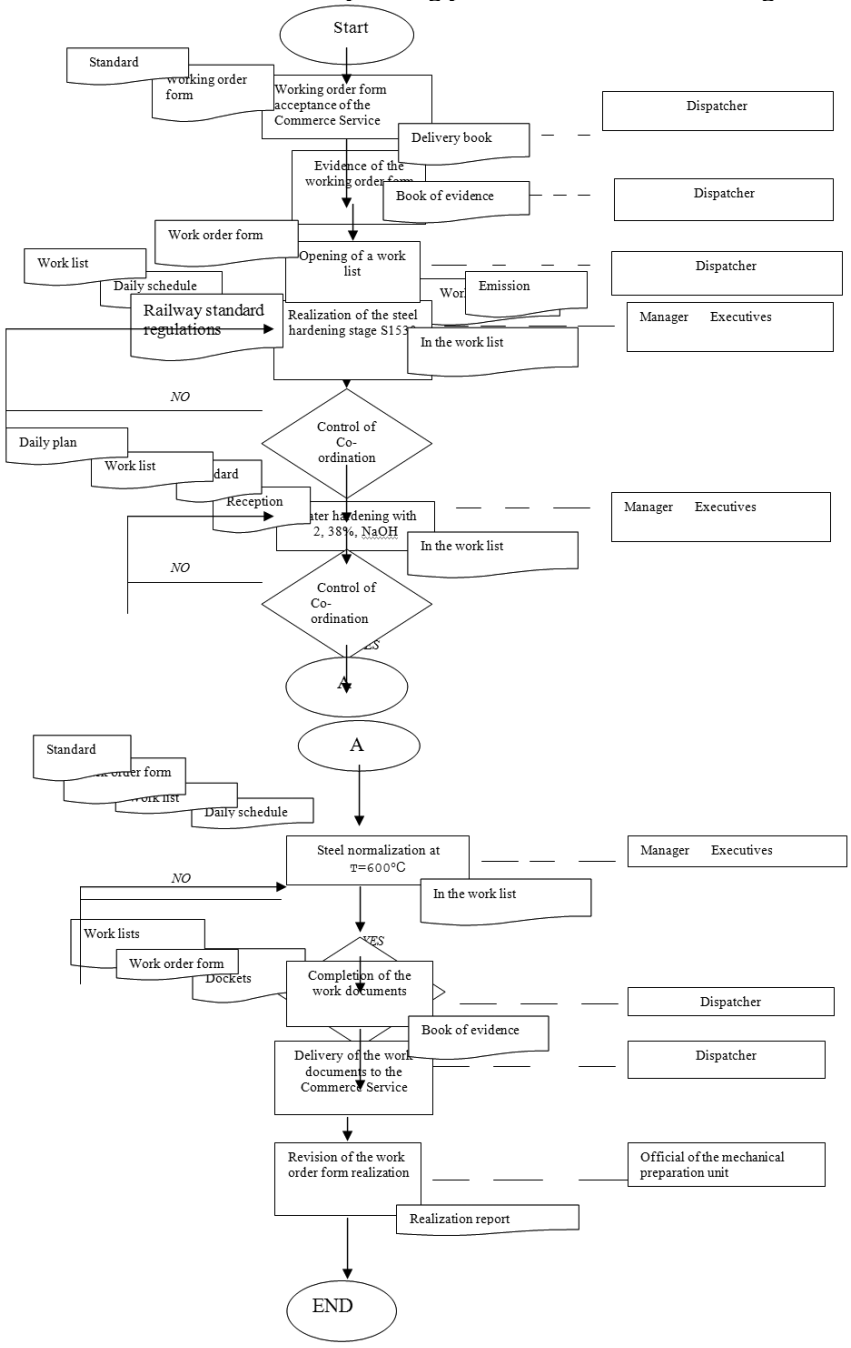
While practising the system of quality provision according to ISO 9001 from year 2000, the need to project and apply the standard operating procedures for all working processes became stressed in order to achieve the defined quality and to protect customers from faulty products. The factory's management put in front of them another task – to improve the system of managing the environment, which includes lowering the amount of waste, lowering the pollution of the air, water and soil, conservation of resources by following energy and material consumption, as well as adapting to all national and local regulations and norms which refer to the environment.

According to ISO 9001 standards, the standard operating processes have been projected by the QC-CE (Quality Circle-Cause and Effect) model, [picture 1] and the standard operating procedure for steel hardening [picture 2].

Picture 1 – Application of QC-CE model at the projection of quality of the steel hardening S1530 technological process



Picture 2 - Standard operating procedure of steel hardening



In accordance with the process of steel hardening, we have set a task for us to follow energy and material consumption in order to determine the optimal parameters. With mathematical casting we can follow the changes in the characteristic parameters in the process within a given space and time in order to determine the optimal parameters, because the mathematical description presents a sum of subordinates that link all parameters in a system of equations.

The technological process of steel hardening takes place at the mint department by which particular characteristics are achieved and are suitable both to the standards and the railway regulations.

As a subject of examination we have shafts with f 35x180 made of steel S1530, with chemical compound of:

chemical compound	*C*	*Si*	*Mn*	P	S
%	*0.42-0.50*	*0.15-0.35*	*0.50-0.80*	*0.045max*	*0.045max*

In the planning phase we project the technological process of steel hardening considering the theoretical parameters of quality hardening, the parameters of hardening in the real system and the results gained by mathematical cast of the process with the MATLAB programme. According to theory, the mechanical characteristics of the shafts after hardening, and in order to achieve the steel hardening quality, should be:

Firmness (HB Brinel)	Plastic deformation (N/mm^2)	Extraction (N/mm^2)
195-207	380-420	600-670

Theoretical parameters of quality hardening develop in three stages:

Warming temperature of furnace °C	Hardening in water at a temperature of (18-19)°C and concentration of NaOH %	Normalisation of the material at a temperature of °C
820-860	(2-7)	(550-660)

According to the measurements gained in the real process of steel hardening at the factory, the mechanical characteristics of steel S1530 after hardening are as follows:

Firmness (HB Brinel)	Plastic deformation (N/mm^2)	Extraction (N/mm^2)
195-210	380-420	600-610

This quality of steel hardening S1530 in the real system can be achieved with the following parameters:

Warming temperature of furnace °C	Hardening in water at a temperature of (18-19) °C and concentration of NaOH %	Normalisation of the material at a temperature of °C
860	(5-7)	(600-610)

With the use of the mathematical cast, we have determined the subordinance of the steel firmness (HB), the concentration of NaOH at temperatures of T= 820°C and T = 860°C.

By entering experimental data for % of NaOH (co-ordinative variable) and firmness HB (ordinative variable) in the MATLAB programme (Pratap, 2005) at temperatures of T = 820°C and T = 860°C, with determined firmness of steel of 195 HB, we get the following results: At a furnace temperature of T = 820 °C by determined steel firmness of 195 HB we have determined the optimal concentration of NaOH as 2.38 %; at a furnace temperature of T = 860 °C the defined steel firmness of 195 HB can be achieved with a 3.06 % solution of NaOH. Considering the loss due to warming temperature of furnace of T=860°C as well as the additional costs for the NaOH solution, we have determined the optimal concentration of NaOH by constant firmness. We can conclude that the optimal parameters for achievement of steel firmness of 195 HB are the following: NaOH concentration of 2.38% and temperature of 820°C.

Results of the application of the projected quality of the technological process of steel hardening S1530

To realize the activity according to Deming's circle, it is of great importance for us to provide all the required conditions. This means that the model has to be tested, because, by its nature it is a presentation of the natural process, but it cannot enclose all of the variables from the surroundings. Thus, it is necessary to compare the model results with the real condition. However, one established model which provides good solutions does not mean that it will function well in the future due to the expected changes within the surroundings or among some of the factors. Eventual changes could lead to changes in the system's exit, so a controlling system for a proper functioning of the model must be provided. In most cases, the control is organised by establishing feedback. Due to this, the standard operating procedure is changed.

Conclusion

The politics of maintaining a healthy environment of the factory for reconstruction and maintenance of rail vehicles anticipates provision of quality in all of its processes and objects at any time and any place. This can be achieved if the factory submits to the laws and regulations, programmes and procedures which refer to a safe environment, because this presents an important component of training, construction of the activity, as well as the stimulation of employees.

Upon the basis of these researches, we have concluded that by the implementation of the MATLAB programme, i.e. by mathematical cast of the steel hardening process S1530 we can determine the most adequate parameters: temperature of 820 °C and concentration of NaOH of 2.38 %, in order to provide the defined quality of the steel shafts by firmness of 195 HB and lowest possible costs of energy and resources, which provides protection of the human environment. This research has proved the fact that savings of electricity amount to €0.13 per piece, while the savings in NaOH consumption amount to €0,05 per piece, which makes a total of €0,18 per piece. In other words, the total sum of savings per year for hardening of 100 000 shafts would amount to €18033. The application of the system for eco-management allows lowering of the dangerous influences over the environment, but also lowering of the expenses required for maintenance of the environment, which creates a good image of the company.

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Results of projects undertaken by students on the MSc in Environmental Management course

Collated and edited by the Research Office

Abstract

Students on the MSc in Environmental Management course were invited to submit reports of their work to the SEEU Review, as it is editorial policy to encourage young researchers. Lack of space prevents us from publishing the full selected texts, which are available from the Institute for Environment and Health Sciences. Here we report a summary of the findings of six projects in relation to environmental issues affecting R Macedonia and/or Kosovo.

Abstrakt

Studentëve të studimeve pasuniversitare, në lëndën Menaxhimi i ambientit iu kërkua të dorëzojnë raportin e punës së tyre për SEEU Review dhe kjo është në përputhje me politikën redaktuese që të inkurajojë hulumtuesit e rinj. Mungesa e hapësirës na kushtëzon neve të mos i publikojmë të gjitha tekstet e zgjedhura të cilat i kemi marrë nga Instituti i Ambientit dhe shëndetit. Këtu ua paraqesim një rezyme për punën e pesë studentëve lidhur me çështjet e ambientit që kanë të bëjnë me Republikën e Maqedonisë dhe Kosovën.

Апстракт

Студентите на магистерски студии по Менаџмент на животната средина беа поканети да ги достават извештаите за нивната

работа за научниот магазин на ЈИЕУ, бидејќи политиката на уредничкиот тим е да ги охрабри младите истражувачи . Недостатокот на простор не спречува да ги издадеме сите избрани текстови кои ни се достапни од Институтот за животна средина и здравје. Тука ќе го наведеме извештајот на резимето на откритијата на шест проекти кои се однесуваат на прашањата од животната средина и кои влијаат на Р.Македонија и/или Косово.

The projects

The following projects are reported here:

1. Contamination of water in the Mitrovica region of Kosovo – Merita Shkodra

2. Knowledge of and attitude of high school students towards the proposed National Park in Shar Planina – Klimentina Trpcevska

3. Creating energy from waste in the Polog region of R Macedonia – Sali Jonuzi

4. The place of SEEU in the forefront of environmental concerns in Tetovo – Lulzime Pajaziti, Kadire Murati and Ibraim Jonuzi

5. The influence of the geological structure, tectonic and hydrogeology of the rocky masses upon the pollution of the underground and surface waters in the river basin of the river Lakavica – Dasmir Asani.

6. Fuel as environmental pollutant in Tetovo - Ibraim Jonuzi, Asan Idrizi (State University of Tetovo), Kadire Murati and Lulzime Pajaziti.

Project One

Contamination of water in the Mitrovica region of Kosovo

Merita Shkdora

Abstract

This project was developed in order to inform the people about the current state of water monitoring in this municipality and necessary activities which must be carried out for an efficient monitoring of water pollution. Data from the *National Public Health Institute* in Prishtina: Results show an excess of maximal allowed concentration of water pollution, not only for inhabited places, but, also for industrial parts. Value of pollutants in measurement points of the rivers Ibri, Sitnica, Lushta and Trepca show the most polluted areas in municipalities.

Abstrakt

Ky projekt u zhvillua me qëllim që njerëzit të informohen për gjendjen e tanishme të monitorimit të ujit në këtë komunë dhe aktivitetet e nevojshme që duhet të ndërmirren për një monitorim efiçient të ndotjes së ujit. Të dhënat nga Instituti Kombëtar Publik të Shëndetësisë në Prishtinë: rezultatet tregojnë një tejkalim të përqendrimit të lejuar më të lartë të ndotjes së ujit, jo vetëm për vendet banuese, por edhe në pjesët industriale. Vlerat e ndotësve në pikat matëse të lumenjëve Ibri, Sitnica, Lushta dhe Trepça shfaqin vendet më të ndotura nëpër komuna.

Апстракт

Проектот беше развиен со цел луѓето да се информираат за тековната состојба на водите во оваа општина и неопходните активности кои мораат да се изведат за ефикасен мониторинг на загадувањето на водите. Податоците од *Националниот јавен институт за здравство* во Приштина: Резултатите покажуваат вишок од максималната дозволена концентрација на загадувањето на водата, не само во населените места туку и во индустриските делови. Вредноста на загадувачите во точките за мерење на реките Ибри, Лушта и Трепча ги покажуваат најзагадените области во општините.

Introduction

The main rivers in Mitrovica are; Ibri, Sitnica, Lushta, Trepqa. Most of the dirtiness of the rivers is due to the fact that they pass through the urban area, which at the same time is the centre of industry, and water is discharged into the rivers without any treatment. Water that comes from the Ibri, before it enters Mitrovica is classified as second class; once the river Ibri has exited Mitrovica, where it has accepted water from the rivers Sitnica and Lushta, , having in mind the water that has been used by the population of the Mitrovica citizens, it is classified as class four and one of the most contaminated in Europe. Over 40% of the population of Kosovo live in areas where water is taken from the Ibri and Sitnica. By 1985, there was approximately 51.5 million m^3 contaminated water discharged into the rivers in Mitrovica and the region, 48.5 million m^3 or 94% came from different parts of the industry, and 2.30 million m^3 or 3.9% came from the population living nearby. It is estimated that by 2000 contamination from industry was 90.7%, and contamination caused by the population living nearby 6.1% as a result of the increasing number of the population in the region.

Table 1. The quality of the rivers in Mitrovica

	Category before the urban zone	Category after the urban zone
Ibri	II	IV
Sitnica	III	IV

Table 2. Contamination in rivers in Mitrovica and the region (mg/l)

River	PH	O_2 wasted	SHKO	$SHBO_5$	NO_2	NO_3	NH_4	P	Pb	Cu	Cd	Zn
Sitnica	5,10 8,72	4,07 5,58	6,88 70,40	9,84 20.7	0,17 14,2	5,50 38,3	3,12 17,50	3,27, 85	0,58,0	0,191, 90	0,025 0,20	2,49. 2
Ibri	7,10 8,80	4,31 6,48	4,76 58,6	8,29 13,79	0. 16 12,5	2,0 31,5	0,75 3,13	7,58, 2	0,291, 66	0. 192, 9	0.0 19 0.20	1,14, 6

Before the 1999 war, waste discharged from the Kombinat corporation "Trepqa", into the Ibri contained contamination of many elements beyond maximum permitted levels. These included lead, potassium permanganate, zinc, phosphate, cadmium and copper. Cadmium pollution was exceptionally high. Post-war results show that, due to the non functioning of this industry, the level of contamination has dropped by one level, but still is high, especially when the river joins with the Sitnica.

Table 3. Contamination in the river Ibri – Kelmend (Lipe) 2003-2005

	Ph	O_2 wasted	SHKO	$SHBO_5$	NO_2	NO_3	NH_4	Ngopsh. me O
2003	8.09	5.21-III	20.9-IV	8.67-III	0.50-III	5.81-II	3.26-IV	58.5-IV
2004	7.79	8.7-I	48.6-V	11.6-IV	0.26-II	6.65-II	2.20-IV	83.8-III
2005	7.88	9.89-I	30.1-V	4.19-II	0.39-III	8.42-II	4.22-IV	97.9-II

During the period March-September 2004, not just in Kelmend, analyses of the river Ibri have been done also in Mitrovica and in Koshtove (6km before entry into the city).

Table 4. Contamination in the river Ibri – Mitrovica and Koshtove, March-September 2004 and 2005

	Ph	O_2 wasted	SHKO	$SHBO_5$	NO_2	NO_3	NH_4	Ngopsh. me O
Mitrovicë .2004-2005	8.21 8.0	9.57-I 13-I	15.6-III 30.6-V	3.10-II 8.4-III	0.15-II 0.15-II	2.4-I 2.3-I	2.96-IV 4.2-IV	85.5-II 135-I
Koshtovë 2004-2005	8.16 8.2	7.02-I 12.6-I	18.8-III 14.2-III	2.6-I 1.3-I	0.08-I 0.09-I	3.8-I 1.5-I	1.27-III 2-III	66.2-II 124-I

If we compare the above analyses of the river Ibri before and after it joins with Sitnica,

at that point we can see how much worse it gets, and how badly the level of contamination rises once the Ibri has joined the Sitnica. Contamination is not just caused by joining with the Sitnica, but also from water that has been used by the industry nearby, and from the rubbish that has been thrown from the bridge of the river, pulled into the river when it rains. In a distance of 3.5 km from the bridges of the river Ibri and Sitnica are disposed roughly 33 million tonnes of rubbish of every kind, with a very high level of contamination of metals and non-metal germs, which altogether can have serious effects on human and other life.

The river Sitnica has the highest level of contamination - level four. This river passes throughout Kosovo, and apart from being used for untreated domestic waste, has been used by most of the industries in the region as a place for discharging contaminated water used for production processes. Before the war, the main factors in contamination used to be the production of oil (Ferizaj), paper (Lipjan), metal (Janjeva), texytiles and milk (Fush Kosova) and mining (Magure), etc. Into the Sitnica, from Ferizaj till it joins the Ibri in Mitrovica, are thrown approximately 100 million m^3 of industrial water per year, 83% of which is discharged from “Elektroeconomis” of Kastriot and from “Trepca” in Mitrovica without being processed or sterilized.

Biochemical analyses of the water have been gathered since 1965, but they are not in order or correct. The other problem is that the measures have not been taken in the specified places (stations).

Table 5. The main contaminants in the river Sitnica – Mitrovica 2003-2005

	PH	O_2 wasted	SHKO	$SHBO_5$	NO_2	NO_3	NH_4	satiati. with O
2003	8.04	8.33-I	16.65-III	9.21-IV	0.95-IV	9.65-II	3.80-IV	42.46-IV
2004	7.72	7.39-I	36.68-V	8.38-III	0.39-III	8.95-II	2.70-IV	71.70-III
2005	7.93	8.59-I	39.01-V	3.54-II	0.43-III	10.37-II	4.62-IV	82.38-II

Contamination of the Sitnica by phenol is a major problem. In 15 places where water has been gathered near to the Sitnica in Vushtrri phenol is present between 0.05 and 0.15 mg per litre and in Mitrovica a much higher level of phenol has been registered, up to 0.54 mg per litre. In first class rivers phenol should not be present at all, whereas in rivers that are classified as second class, phenol should be permitted to a maximum of 0.01 mg/l rising to 0.3 mg/l for rivers of the fourth class, the maximum permitted level (MPL). If phenol is present over MPL in a river, it is dangerous for any existing life-form that uses this water for any purposes. In January 2003, phenol in the Sitnica and Ibri was up to 88 times over MPL, and three times more than the category four (0.3 mg/l). Analysis carried out by KFOR showed phenol 5.5 times over the permitted level of contamination in rivers that are categorised as level four, which includes Sitnica.

The Sitnica was at one time used for fishing. Now due to the effect of the contamination from industrial and other factors, Sitnica is a river where no fish or other living thing exists. It should be also mentioned that years ago Sitnica was a river that used to be frozen for up to 60 days, whereas nowadays this does not happen. So clearly there are major ecological changes.

In Mitrovica there are not just the Ibri and Sitnica rivers, but there also the smaller Lushta and Trepca rivers, however they are not much different from Ibri or Sitnica in regards to the contamination.

Resulting state of the rivers

Based on the analysis (25 parameters) produced by the World Health Organization, in relation to these rivers, also analysis of water that has been released from the industry in production of metal-rock, and many other chemical materials, and also analyses that are produced from their contamination, the conclusion is reached that the state of these rivers for water supply, fishing, and recreation, is as follows;

- River Ibri before it joins Sitnica and the entry in the city, can be used for all purposes.
- River Ibri after it passes through the city, before it joins Sitnica, is contaminated by the persons living in the city. At this stage, this water can be used for plant watering, but fishing is not recommended due to the danger that is caused by many factors.
- River Sitnica before it joins any water that has been released by the industrial corporations is so contaminated that this water can be used only for plant watering. Even though at this stage this water might have organic substances from the industry in Kastriot, so the quality of this water has to be controlled by farmers.
- River Ibri after it joins Sitnica, should not or cannot be used for any purpose.
- River Trepca, since it accepts a large amount of water from industry, should not be used for any purpose.
- River Lushta is a river that has been used by villagers for discharging water that has been used for their purposes (i.e. toilets, cleaning, etc), and other contaminants, so it is very dangerous for the population in the region.

Schemes for water decontamination have not been in process, and many elements that have been thrown in the water have not been adequately treated. Zinc electrolysis and other chemicals used in the water or rivers have not functioned as they should have had, or it can be said that these chemical elements have not had any effect whatsoever.

The situation now

Due to the non-functioning of industrial objects of "Trepca" (accumulator, chemicals from the industry, electrolysis etc), the level of contaminated water from the industry at the moment is lower. However, at the same time the level of contamination that is caused by the towns has increased (by concentration of the population in the region), therefore contamination in the rivers in question are caused entirely by the industries and the boroughs, especially the borough of Mitrovica in the region.

Conclusion

Contamination between industrial activities it is minimal due to the non-function or blockage of a row of buildings which they were the main reason of water contamination. It is quite noticeable that part of the problem is due to the building without permission being build on places that there should not be builded, also increasing products used by the citizens nearby that have been wasted in the rivers, old machineries been dumped in the rivers etc, another issue is that water that it is been used by population living nearby, all that water it is been dumped in the rivers. If this issue could be taken care of by the borough of Mitrovica, there will be a large improvements in regards to the contamination. Based on the information that I have gathered, founds that are given by the Kosovo government in regards to this issues or protecting the environment are not enough.

Even though it has been formed government sector for protecting the environment, and gradually it is developing on every sense (legal, professional etc) still there is a place for improvement.

It also should be noted that Kosova agency that protecting the environment, should be working with external agencies (from other countries). By seeing how other agencies are working, operating, managing their resources, Kosovo would improve their services, knowledge, management, informing the citizens on how to protect the environment and the world.

Media is another source of bringing to the attention of the Kosovo citizen on how to protect the environment, and them self. Without safer environment there would not be a healthy Kosovo.

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Project 2

Shar Planina – a Promising Challenge

Klimentina Trpcevska

Abstract

This paper analyses the opinion from the high school graduates from Tetovo regarding the initiative for naming Shar Planina as a national park in the Republic of Macedonia. In this paper, one also examines the understanding of the graduate students about Shar Planina's natural resources. The methodological tool used in the research is survey and the questionnaire is written in the language in which education is being conducted in the schools. The survey was completed in December 2007 in all secondary schools in Tetovo. The results from the survey demonstrated that the surveyed graduate students from the high schools in Tetovo do not have sufficient knowledge regarding the natural resources of Shar Planina. Regarding the initiative, the results of the survey demonstrated that 68.69 percent of the graduate students answering to the questionnaire support the initiative of naming Shar Planina as a national park. Furthermore, 64.78 percent of the graduate students expressed their readiness to get actively involved in the initiative for naming Shar Planina as a national park.

Abstrakt

Në këtë punim hulumtohet mendimi i maturantëve nga Tetova për iniciativën e shpalljes së Malit Sharr për park nacional në Republikën e Maqedonisë. Në punim gjithashtu ekzaminohet se sa maturantët nga Tetova janë të njohtuar me pasuritë e saja natyrore. Si metodë hulumtimi shfrytëzohet anketa dhe pyetësori anketues i cili është shkruar në gjuhën në të cilën ndiqet mësimi nëpër shkolla. Anketimi u zbatua në muajin dhjetor të vitit 2007 në të gjitha shkollat e mesme në Tetovë. Rezultatet e anketës

treguan se nxënësit-maturant të shkollave të mesme në Tetovë nuk tregojnë njohuri solide për pasuritë natyrore të Malit Sharr. Në lidhje me iniciativën, rezultatet e anketës vunë në pah se 68.69% nga nxënësit-maturant të anketuar të shkollave të mesme nga Tetova e mbështesin iniciativën për shpalljen e Malit Sharr për park nacional. Gjithashtu 64.78% nga nxënësit-maturant të anketuar ekzaminojnë gatishmërinë e tyre për kyçje aktive në iniciativën për shpalljen e Malit Sharr për park nacional.

Apstrakt

Во овој труд се истражува мислењето на матурантите од Тетово за иницијативата за прогласување на Шар Планина за национален парк во Република Македонија. Во трудот, исто така се испитува колку матурантите од Тетово се запознаени со нејзините природни богатства. Како истражувачка метода се користи анкета и анкетен прашалник кој е напишан на јазикот на кој се следи наставата во училиштата. Анкетирањето е спроведено во месец декември 2007 година во сите средни училишта во Тетово. Резултатите од анкетата покажаа дека анкетираните ученици матуранти од средните училишта од Тетово не покажуваат солидни познавања за природните богатства на Шар Планина. Во врска со иницијативата, резултатите од анкетата покажаа дека 68.69% од анкетираните ученици матуранти од средните училишта од Тетово ја подржуваат иницијативата за прогласување на Шар Планина за национален парк.Исто така, 64.78 % од анкетираните ученици матуранти ја искажуваат својата подготвеност за активно вклучување во иницијативата за прогласување на национален парк на Шар Планина.

Introduction

The initiative for launching of the procedure for naming part of the mountain Shar Planina located on the Macedonian side as a fourth national park corresponds with the goal of the Macedonian government to increase the proportion of environmentally protected areas. The current protected area totals 7 percent, while the desired area is anticipated to be 12.5 percent by 2015 (Andonovski & Pop-Stojanov, 2006). In that respect, the contribution by the public in the process of naming a national park is of great importance and the analysis of the public opinion is one essential segment in the overall

procedure. This paper analyses the opinion of graduate students from secondary schools from Tetovo regarding the initiative. Furthermore, the paper makes an assessment of the knowledge that graduate students possess about the natural resources of Shar Planina.

For this purpose 230 graduate students from all secondary schools in Tetovo were surveyed using 26 questions in both Albanian (64%) and Macedonian (36%) languages, about two-thirds living in the Municipality of Tetovo (Table 1), 50/50 gender distribution and about 70% with 'excellent' or 'very good' grades. Only about 5% are members of an environment protection organisation.

Table 1

Municipality	Surveyed	%
Tearce	14	6.08
Jegunovce	11	4.78
Tetovo	145	63.04
Berovo	1	0.43
Brvenica	20	8.69
Struga	2	0.86
Gjorce Petrov	1	0.43
Kicevo	1	0.43
Debar	3	1.3
Zelino	11	4.78
Bogovinje	13	5.65
Brodec	1	0.43
Vratnica	1	0.43
Gostivar	5	2.17
Kacanik (Kosovo)	1	0.43
Total	230	100

From all of these municipalities, only Tetovo, Jegunovce, Tearce, Gostivar and Bogovinje are located in the proposed boundaries of the national park of Shar Planina.

Some key results relate to the knowledge of the students and identifies some serious gaps in the educational process, where 65% of the students thought was inadequate in this respect (and 16% did not know). Only 11% knew that the initiative for naming Shar Planina as a national park in RM started ten years ago. Almost half did not know the answer to the question and the rest thought it was more recent, while only 11% knew that Kosovo had already declared Shar Planina a national park on its side of the border.

70% correctly identified the largest river (Pena) but knowledge of the existence of glacial lakes was unsatisfactory. About half correctly identified endangered animal species (the most frequent animal mentioned was the bear, while the rest are: wolf, fox, rabbit, weasel, squirrel, bob-cat, wild cat, deer and chamois), but only 25% identified at least one animal on the European Red List. In relation to the number of plant species, 24% answered that there are less than 50 plant species; 24% answered that there are between 51 and 100 plant species; 18% answered that there are between 101-500 plant species; 20% answered that there are more than 1000 plant species (the correct answer), while 9% did not answer the question. The large number of unanswered and incorrect answers to this specific question as well as the comments of the students regarding this question, points out that the ninth question is one of the more difficult ones in the questionnaire. Furthermore, in the educational programme there is very little or no attention given to such topics. Only 3% correctly identified the butterfly as the most important group of insects. About 45% knew the correct definition of 'national park' and the definition of 'protected area' was widely interpreted.

Taking the opinions of the students, a number of activities were thought to have a negative impact on biodiversity, the most important of which were construction, hunting, illegal wood-cutting. Most students got their information from TV, radio and the written media. The gains to be had by naming a national park were several, individual ones included protecting natural resources, sustainable use of forests, eco-tourism and alternative sport. About a third thought that the reason for having a national park lay in the endangered endemic and relict plant and animal species, smaller numbers the rest for preservation of relief characteristics or protection of geo-morphological characteristics. However, over 40% thought all these reasons apply. Most students thought the main supporters of the initiative were the public and local communities rather than central government, the media or NGOs and 80% took the view that naming Shar Planina as a national park would have a positive effect on the living standards of the local population. Of the students themselves, 70% clearly supported the initiative, 8% did not, and the rest were undecided, which the author considers a worrying statistic. Numbers changed slightly when students were asked whether they would get actively involved in various ways including campaigning, debating, lobbying: 65%, 12% yes and no respectively.

At the end of the questionnaire sheets in the section 'remarks', about a third of the students expressed their comments regarding the survey, all of which

were positive and many of which called for more information and publicity about the initiative.

Conclusion

The results from the survey demonstrated that the graduate students from the secondary schools do not have satisfactory knowledge regarding the natural resources of Shar Planina. As a reason for this insufficient knowledge and understanding of Shar Planina one can point out to the insufficient coverage of these topics in the content of the education process as illustrated by the statistics above. From their remarks one can conclude that the students are looking at this activity very seriously. Moreover, they support it and they express their readiness to get involved in the initiative for naming Shar Planina as a national park.

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Project 3

Creating energy from waste

Sali Jonuzi

Abstract

Nowadays the energy supply is one of the biggest problems for countries, in the time when we have a technological development, growth of population, decrease of mineral raw material and especially the fuel of fossils as: petrol, natural gas, coal, etc. On the other side the presence of crises regions, as Iraq, Afghanistan, Iran, Venezuela, etc, and with the increase of demands from non-producing countries, the price of oil and energy is going up day to day. The results of research show that Macedonia, and especially the region of Polog, in this phase of development can produce energy from waste and throw-outs. The result from this research is enough to start concrete activities for reusing throw-outs and waste as raw material for producing energy for technological processes and heating energy as a replacement of fuel which is very expensive and can hardly be supplied. With the reuse of throw-outs, we will have positive effects in cleaning the environment, financial save up of companies that will use these services, stimulate citizens to select the waste, increase of employment etc. We will elaborate the legal principles of the Republic of Macedonia dealing with this problem and will compare the same with existing legal aspects in the European Union. As a conclusion to this research we will give some suggestions and further activities in managing with throw-outs and optimal possibilities for using the same as a source for replacement of fossil fuel.

Abstrakt

Në kohrat e tanishme problem mjaftë të madh paraqet për shtetet furnizimi me energji,kur kemi një zhviilim teknologjik në ritje,rritje të numrit të popullatës,zvoglim të sasive të lëndëve të para minerale,e posaçrisht lëndëve

djegëse me prejardhje fosilore si që janë: Nafta,gazi natyror,thëngjilli etj. Nga ana tjetër me paraqitjen e rejoneve të krizës,si që janë; Iraku,Afganistani,Irani,Venecuela etj.dhe me rritjen e kërkesës nga shtetet jo prodhuese,në tregjet botërore dita ditës rriten çmimet e naftës dhe energjisë. Rrezultatet e hulumtimit dëshmojnë se edhe në Maqedoni,me theks të veçant në rajonin e Pollogut,me këtë fazë të zhvillimit ekonomik ka mundësi për të përfituar energji nga hedhurinat dhe mbeturinat. Rezultatet nga ky hulumtim janë të mjaftueshme për të filluar aktivitetet konkrete në ripërdorimin e hedhurinave dhe mbeturinave si lëndë të parë për të përfituar energji për proceset teknologjike dhe energji nxehtësie si zavëdësim të lëndëve djegëse që janë me kosto të lart dhe vështirë sigurohen. Me ripërdorimin e hedhurinave, do të kemi efekte pozitive në pastrimin e ambientit jetësorë, në kursimin e mjeteve finansiare të kompanive që do ti shfrytëzojnë këto shërbime,në stimulimin e qytetarëve për të bër selektimin e hedhurinave dhe ritjen e punësimit të popullatës. Në fund të hulumtimit do të japim disa sugjerime për veprime të mëtutjeshme në menaxhimin me hedhurina dhe mbeturina dhe mundësit optimale për shfrytëzimin e të njejtave si burim për zavëndësimin e lëndëve djegëse me prejardhje fosilore.

Апстракт

Во сегашно време голем проблем за државите претставува снабдувањето со енергија, кога имаме еден технолошки развој во подем, зголемување на бројот на населението,намалување на количините на минералните сурвини, а посебно горивата од фосилно потекло како што се: нафта, природен гас, јаглен и др. Од друга страна со појавата на кризните региони,како сто се: Ирак, Афганистан, Иран, Венецуела идр,и со зголемување на побарувањето од државите кои не се производители, во светскиот пазар секој ден расте цената на нафтата и енергијата. Резултатите од истражувањето потврдуваат дека и во Македонија,со посебен акцент во Полоскиот регион, во оваа фаза на технолоскиот развој има можности за производство на енергија од отпад. Резултатите од овој труд, се доволен показател за да се отпочнува со конкретни активности за употреба на отпад како основна суровина за производство на енергија за технолошките процеси и топлинска енергија како замена на горивата кои се со високи цени и теско се обезбедуваат. Со употребата на отпадот, ке имаме позитивни ефекти во чистењето на животната средина, во заштедата на финансиските средства на компаниите сто ќе ги користат овие услуги, во потикнувањето на граѓаните за да вршат селектирање на

отпадот,зголемување на вработеноста идр. Ке претставуваме и законската регулатива во Република Македонија што го регулира оваа проблематика и ке го споредуваме со законската регулатива од државите на Европска Унија. На крај на истражувањето ќе предложиме неколку сугестии за понатамошни постапки во менаџирањето со отпад и оптималните можности за искористување на истите како извор за замена на горивата од фосилно потекло.

Introduction

The importance of creating energy from waste in a time when the lack of energy is felt, or the price increase of the same and is very hard to find it, it is a very actual issue and it should be considered carefully. As sources for energy creation from waste can be used: housing waste (municipality), agricultural waste, (from farms etc) and industrial waste (wood industry, textile industry, plastic industry etc.) In this paper I focus mainly on the analysis of the actual situation and propose a solution for each of the types of waste, with emphasis on the Polog region. Tis requires estimating the actual waste situation, the means of accumulation, transportation, selection, storing and recycling. The accumulated data from relevant sources, the civic estimation and the results of specialized institutions are checked and adapted to the standards for creating energy from waste and proposed according to the Law of this subject in the Republic of Macedonia, but also I analyse the possibility of gaining experience from the states that use technology for creating energy from waste. I analyze the influence of all the factors in this problem, emphasizing the work of all the actors in the waste selection process, the municipality, various enterprises, local and central government, international organizations which deal with these problems. I aim to influence the raising of the conscience of the population of these areas for ecological behaviour and also make them give their contribution in saving the living environment.

Alternative energy in the cement industry

The first material which is created from waste can be used as fuel which will replace the petroleum jelly, gas, cobbles and other materials with fossil origin in the cement industry, for creating electric energy and heat. This basic material from waste is used in The Netherlands, and it will good if

their experience is also used in the Republic of Macedonia. The cement industry values the use of alternative energy as key factor which gives its contribution to the total strategy. The approach toward waste as alternative energy resource depends on the legal rules from the living environment sphere, their implementation and adaptation of the infrastructure to the waste management.

The EU has developed strict rules for waste management. The Directive for packed waste-Packaging Waste Directives -94/62/EC, 2004/12/EC, promotes recycling increase and energy use. The Storage Directive 1999/31/EC, predicts standard procedure for waste reception: treatment before storage, the waste to be stored based on the classes. The Directive for waste prohibits storage of organic waste with energetic value which can be burned in energetic or cement installations or incinerator. The main legislative act which has to do with cement production is the Directive for waste burning (not dangerous) (WID)-2000/76/EC, for prevention or decrease of negative influences in the living environment caused from burning or co-burning of the waste.

Alternative materials which are used for alternative energy creation are used tyres, paper, wood, plastic and selected municipality waste. Maximal increase of generative energy from the waste means that all the energy can be used directly in the ovens for clinker production. Maximal use of the part of the waste that is not burned and elimination of the need for ash storage, because the inorganic part replaces the basic materials in the cement industry.

Legal regulation

In the Republic of Macedonia, waste management is regulated by the Law for waste managing (Official Newspaper of RM no.68/2004, article 28: (i) Waste that contains used materials should be re-manufactured, if it is possible to re-use its constituents and if technical-technological conditions exist; (ii) manufacture of waste should be done without using processes and methods which endanger the living environment, life and people's health; (iii) if waste manufacturing isc a danger for the living environment, life and people's health and the expenses of waste manufacturing are large and economically non-justifiable, the waste should be totally or temporarily exported from the Republic of Macedonia to the nearest states where it can be manufactured or taken away; (iv) the obligation under the first paragraph

will not be applied, if storage of waste is seen as less danger for the living environment, life and people's health more than the manufacturing itself, so we should have in mind the use of natural resources, the energy needed for manufacturing or which is created from the waste, the content of dangerous materials in waste produced after manufacturing, and substance and energy emission into the air, water and ground.

In relation to Macedonia's candidature for EU membership, its energy policy is a key factor for achieving the required development. State energy policies should have three main aims: ensuring energy supply; improving of competition and efficiency in energy use; saving the living environment. The EU Council on March 2007 obliged itself to increase energy efficiency by 20% and obligatory aims for participation of 20% of renewable resources from the whole energy production, including also bio-fuels Directive 2001/77/E3, promotes the energetic resources that can regenerate in the energy production. In the Republic of Macedonia the realization of the preparations for energy efficiency strategy by 2020 is initiated.

Energy strategy is also indirectly covered in the Law for living environment of RM. The durable development principle is incorporated in this Law. In the Law is also mentioned that when an activity is taken or realized, attention will be paid to rational or durable use of natural resources so we can make sure that the need for healthy environment, and also the social and economic needs of today's generation are fulfilled without endangering the rights of the next generation, so they can fulfil their needs.

Industrial and municipality waste

The agricultural sector

The agricultural sector plays a very important role in the economy of the Republic of Macedonia (10% of the GDP). From this sector, the waste includes corn chaff, corn stalk etc and also the possibility of bio-digestor buildings for creation and use of biogas of the animals and wildfowl farms, because they lead to the decrease of methane emission.

The forestry sector

In the republican level more than 70.000 m^3 of waste are generated from the wood manufacturing industry, and about 150.000 m^3 wood waste are created from tree cutting. In Polog, having in mind the population number and forest surfaces, this amount is around 25% of the amount in Republican level.

Waste quantity

Table 1: waste creation in different states

	Austria	Denmark	Slovenia	Croatia	Macedonia
Total amount of waste in kg	6000	2407	4200	2840	250
The amount of municipality waste per inhabitant, kg	383	574	400	270	237

Table 2: manufacture and storage of municipality waste in different states.

	Austria	Denmark	Slovenia	Croatia	Macedonia
Accumulated waste for recycling	34,3%	14%	10%	10%	/
For biological manufacture	21,7%	/	12%	1%	/
For burning	14,7%	81%	/	/	
For storage	28,5%	5%	73%	89%	100%

(Carl Bro Consortium in frames of EU CARDS program for Croatia, 2003)

Data shows that the Polog region municipalities have a high concentration of residences and population density with a high population growth and therefore a high level of waste, disposed of in an unregulated way as there are inadequate facilities. Acording to data from companies which do accumulate the waste, the amount is 237 kg/inhabitant/year whereas the waste quantity varies from about 20,000 kg per year per inhabitant in Tetovo and Gostivar to much smaller quantities in smaller locations. The total for

Pollog is about 70,000 kg per year: analysis of the figures according to international measurements of the components of municipal waste suggest that most of it can be burned or used as replacement for fossil fuels, having in mind the cemical composition and presence of organo-metallic pollutants (cadmium, arsenic, zinc, etc and energy values of the materials).

Table 3 Theoretical possibilities for using the waste according to international data

Type of waste	Quantity,kg/inhabitant	%
Total amount of the waste	368	100
Quantity that can be recycled	145	39,40
Biologicaly degradated quantity	183	49,73
Quantity for storage	40	10,87

Conclusion

There are many advantages in producing energy from waste. Based on the statistics, the efficient use of waste from municipalities in the Pollog region could have a major effect on improving the environment and on saving natural resources while also creating employment opportunities. This requires, among other things, creating waste sites and storage, creating the conditions for accumulation system, transportation and waste storage from residences. It requires educating the public in the advantages of proper waste management in an area with a high population concentration and projected growth..

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Project 4

The role of SEE University as a foremost Institution for increasing environmental consciousness

Lulzime Pajaziti, Kadire Murati and Ibraim Jonuzi

Abstract

The main purpose of this work is to increase the consciousness and awareness of citizens on how much we are interested in maintaining the plant and animal world and the living organisms in general, i.e. the environment surrounding us and the nature as a whole. The degree of consciousness in the society concerning the environment leaves a lot to be desired. It is about time for everyone to start first from themselves to make the first steps – it does not matter how small they are. We came to these conclusions by performing a survey with questions relevant to the environment we live in. The questionnaire has brought to light our values so that we have a lot of possibility for action in the direction of protecting the environment. This should encourage us to further tighten our relationship with the environment and to find proper ways for improving it, so that we live in cohabitation with our environment and the nature.

Abstrakt

Qëllimi kryesor i këtij punimi është që të shihet ndjeshmëria e qytetarëve ndaj çështjeve të mjedisit dhe sa ne jemi të interesuar që të ndihmojmë në ruajtjen e botës bimore, shtazore dhe të jetës së gjallë në përgjithësi. Shkalla e ndërgjegjësimit të opinionit të gjërë në lidhje me mjedisin ende nuk është

në nivelin e duhur. Është koha që çdokush të niset nga vetja dhe hapat që duhet hedhur sado të vogla që të jenë, kanë vlerë shumë të madhe. Për të ardhur deri te këto konstatime kemi realizuar një anketë, me anën e së cilës kemi nxjer në pah vlerat tona. Konstatimi i jonë është se ne kemi mundësi të mëdha për veprim, në drejtim të ruajtjes së ambientit jetësor dhe pikërisht kjo duhet të na inkurajojë të forcojmë edhe më tej, lidhjen e ngushtë me mjedisin dhe gjetjen e mënyrave më të përshtatshme për një zhvillim të qëndrueshëm.

Апстракт

Целта на овој труд е да се види осетливоста на граѓаните кон прашањата за средината и колку ние сме интересирани за да помогнеме во заштитата на растителниот, животинскиот свет и живиот свет воопшто. Степенот на совесноста на поширокатa јавност во врска со средината се уште не е во потребното ниво. Време е секој да почне од себе си и чекорите кој треба да се направат колку и да се мали, имаат големо значање. За да дојдеме до овие заклучоци реализиравме една анкета, со неговата реализација ги извадивме и истакнавме нашите вредности. Наша констатација е дека ние имаме големи можности за дејствување, во насока на заштита на животната средина и токму ова треба да не охрабри да ја зацврстиме и понатаму, тесната врска со средината и наоѓање на целисходни начини за одржлив развој.

Introduction

By taking into account recent developments in technology and the economy and the interferences in the environment there have been massive and rapid changes in the nature equilibrium. This has led to an increasing danger for the existence of living organisms on the biological basis. In order to eliminate these serious consequences we have to find the cause and always look for new strategies.

The surroundings where we live are in functional harmony with all parts around them and follow many laws governed by nature which the human factor should respect. However, nature shows the first signs of losing the “war” initiated by humans. If we continue to treat nature in the way we do it

up to now, then it will be much more difficult for future generations to live in harmony in this world or even worse bring ourselves to self destruction.

Everyone has to understand that any action against the laws of nature, no matter how simple they are, have a negative effect on the environment. We all want a clean environment, but we forget the main task, namely our contribution in this direction. In many countries of the world, especially the developed ones, much more attention is paid to education and awareness toward the environment because the responsibility ultimately lies with society as whole.

The increase of education and awareness about the problems of the environment in society is a main pre-condition for applying rules for the protection of the environment. Maintenance and protection of the environment today is one of the main responsibilities of our society in general.

Environmental Education

Consciousness of citizens

The roots of an environmental education are old. However, the greatest effort has been taken in the 20th century due to the rapid industrialization and technological development of societies. This has led to the development of different international organizations whose main purpose to increase the awareness and responsibility of society for environmental problems, and to propose solutions for overcoming these problems. This was followed by many rapid stages of development concerning the protection of nature, with the main purpose to associate environmental protection with industrial development. This means on one hand to keep the propaganda about nature protection always alive and on the other hand always to look for methods and ways how to improve our environment accordingly.

R. Macedonia also makes attempts to stay in step with the international activities for environmental protection. However, as a developing country we are still behind and not concentrated in activities necessary for an effective protection of the environment. We need to perform much more work especially from the practical side for the increase of the consciousness in the society. There are many countries in Europe including ours that have

put environmental education at a high level in their teaching processes in the schools in order to have a more real survey over the surroundings. However, there is a big gap between theoretical teaching and application of these thoughts in practice.

Preventive measures for avoiding pollution

The purpose of this work is to show how important it is to increase civil consciousness, and the role of environmental organizations, different educational institutions, private companies and many other institutions. An explicit example in this direction not only in the area but even beyond it has been given by the South East European University (SEEU).

Just entering the university shows how much attention is paid for maintaining and keeping of the environment as an attribute of the harmony human – nature. Also starting from the point of view that many students come from different parts of the country and even different countries, the role of the university toward the environment has increased in importance.

Within the frame of the university there exists a wastewater recycling plant, one of the most modern not only in the area but even in Macedonia. This kind of recycling leads to manure and water for agriculture. This example should be followed by other institutions (companies) private and public in order to better solve the environmental problems for a healthy environment and better living conditions.

Humans, as the main factor that contributes to the destruction and change of the ecosystems, need a new culture with respect to their behaviour toward the environment and nature. The most important is the transformation of the human from an over-user into one that respects the ecosystem, and lives in harmony with the laws of nature.

Taking into account that youth is the future of one society, their role on the protection of the environment may be very important, without leaving out the role of the family and of the schools, i.e. of the educational institutions. Exactly this issue of dealing with the matter of defending the environment and nature as whole in the early ages leads to the development of consciousness for a better protection of the nature and of the environment we live.

The question is how much we are ready to help and inform ourselves about the world surroundings. For the answer to this question every one of us should look into ourselves and our behaviour toward nature.

Investigation methods

The questionnaire realized at the SEE University with different subjects will help us in the future for having a cleaner and healthy environment. Also this will help us to have a better overview over how much we are interested in protecting nature and the environment in which we live. Starting from the point that we are studying a subject very actual and of main importance in many countries of the world, it is necessary to have a very serious and careful approach in this direction.

The interviewed persons are leading personalities, teachers, administration employees and students of different semesters. Both genders have been involved with 136 persons altogether questioned. The results have been summarized in Table 1.

Table 1. Summary of different groups of respondents

Groups according to their responsibility	*Female*	*Male*	*Number of persons*	*%*
Managers	**2**	**3**	**5**	**3.7**
leaders and teachers	**8**	**1**	**9**	**6.6**
administration employees	**5**	**2**	**7**	**5.1**
Ist year students	**12**	**11**	**23**	**16.9**
IInd year students	**26**	**16**	**42**	**30.9**
IIIrd year students	**16**	**9**	**25**	**18.4**
IVth year students	**5**	**20**	**25**	**18.4**
Total	**74**	**62**	**136**	**100**

Presentation of results from the questionnaire realized with different persons at the SEE University.

The questionnaire is made of 9 questions with a possibility to choose and was performed in the mother tongue of the interviewed person in June 2007. The results are presented below.

1. How much do you like the living environment at the SEE-University? 77% very positive rating certifies that SEEU is a good example contributing to environmental protection and for increasing the consciousness of the citizens not only in the region but also beyond it.

2. Are you satisfied with level of cleanness at the SEEU? 61% answered 'very much'. The idea of being a good example concerning the environment should be encouraging to us for further efforts. The smaller percentage 'very much' compared to the first question indicate that we should do more in this direction.

3. Do you like the order in the sense of environmental protection? 90% answered 'yes.

4. Do you observe a difference in the sense of environment between the SEEU compared to the area where you come? 73% answered 'yes.'

5. Do you think that the environment at our University will help increasing the awareness about the environment in general? 89% answered 'yes.' Our university contributes towards increasing the consciousness of citizens, staff, students and visitors.

6. Do you like the water you drink at the University campus? 66% answered 'yes'. From the water analyses made every year it is verified that the drinking water fulfils the required standards. The negative answer to the question may have other reasons.

7. Is there any difference in the drinking water of the University compared to the area where you come from? 48% 'very much', 40% 'less', 12% 'no difference.'

8. Are you informed that the University has its own wastewater recycling facility ending with the water and manure products for agriculture? 72% had heard about it for the first time, 19% knew, 9% 'do not care.' It is obvious that more should be done towards propaganda and awareness of individuals inside the campus about facilities available that contribute to recycling and the environment in general.

9. Do you think that a similar recycling process would have helped solving the wastewater problem in the state level? 82% agree. We believe that other private and state institutions will follow our example toward improving and protecting the environment.

Conclusion

The questionnaire reveals that a large number of interviewed persons are not informed concerning the environmental problems. Our country, although belonging to the one in development, should not observe environmental problems only as an advertisement. On the contrary it should do everything, within its possibilities, to stop the pollution and extensive exploitation of our environment.

Citizens should ask for more information about the measures how we protect the environment and thus improve their lives. The example of our university really leaves a lot to be desired, without leaving aside the wastewater recycling system.

Taking into consideration that environmental protection is very important and in a direct way influences our way of life and health, all of us should pay much more attention to the environment and find the ways to avoid and minimize pollution and improve it. We are witness that the earth makes the last call for saving it and the humans should answer to it. Every one of us can answer to this call just by starting with ourselves and our private property up to the public level. This continuation or chain should be kept and there should be a very strong reciprocal cooperation not only with the existing standards and laws but even improve them.

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Project 5

The influence of the geological structure, tectonic and hydrogeology of the rocky masses upon the pollution of the underground and surface waters in the river basin of the river Lakavica

Dashmir Asani

Abstract

This project concerns the problems of the influence of the geological structure upon the pollution of the waters in the river basin of the river Lakavica. During the analyses of this factor the geological structure of the ground, the hydro-geological characteristics of the rocky masses and their resistance to the process of erosion were considered. Depending on the hydro-geological characteristics it is necessary to be careful about the pollution of the underground as well as the surface waters of the river basin of this river.

Abstrakt

Ky projekt trajton problemet e ndikimit të strukturës gjeologjike rreth ndotjes së ujërave në shtratin e lumit Lakavica. Gjatë analizave të këtij faktori u shqyrtuan aspektet vijuese: struktura gjeologjike e tokës,

karakteristikat gjeologjike të materialit guror dhe rezistenca e tyre ndaj procesit të erozionit. Varësisht nga karakteristikat hidro-gjeologjike është e nevojshme të jemi të kujdesshëm lidhur me ndotjen e nëntokës si dhe sipërfaqes së ujërave të shtratit të këtij lumi.

Abstrakt

Овој проект ги опфаќа проблемите кои се однесуваат на влијанието на геолошката стуктура врз загадувањето на водите во речните басени на реката Лакавица. Во текот на анализите на овој фактор беа разгледани геолошката структура на земјата, хидро-геолошките карактеристики на каменливите маси и нивната отпорност на процесот на ерозија . Во зависност од хидро-геолошките карактеристики неопходно е да се биде внимателен за загадувањето на подземните и површинските води на речните басени на оваа река.

Introduction

In this project, the problem of the influence of the geological structure upon the pollution of the waters in the river basin of the river Lakavica is treated. In it all types of rocky masses that participate in the structure of the river basin, according to their age are described and also the meaning of the structures and the hydro-geological characteristics (conductive and preserved) of the rocky masses is given. During the analyses of the necessary documentation their characteristics, age and their structure are considered.

Geological structure

In the geological structure of the ground of the river basin of the river Lakavica there are different types of rocks, with different structure and different age which in a time frame belong to Paleozoic, Mesozoic and Cenozoic eras. Among them according to their age, there are metamorphic, sediment, and magma rocks.

Complex of Paleozoic, metamorphic and magma rocks

The rocky masses of this complex territorially are spread almost in the whole river basin of the river Lakavica, on its right as well as on its left side. In a quite big area these Paleozoic rocks can be found on the Bistra mountain, on the side that belongs to the river basin of the river Lakavica, then on the northern side of the Bukovic mountain and on the northwestern side of the mountain Dobra Voda. In this complex of Paleozoic rocks, metamorphits with devonic oldness and magma drains or breaches can be distinguished.

Complex of devonic metamorphic rocks.

The devonic metamorphic rocks are widely spread in the west, south and east side of the river basin. As main representatives of these rocky masses are the philits and the marble. The philatoids (FD 1,2) are metamorphic rocks which mostly contain philits in their structure and besides them there are also argiloshists, argilophoilits, sandpits, sericitical-quartz schist etc. The mentioned rocks very often change littorally and temporally i.e. horizontally and vertically exceed to one another. The philits in the river basin can be met at different places. They are well developed in the west side of the basin, on the mountain Bistra, then at the place where the mountains Bistra and Bukovic reach themselves, near the Straza pass as well as in the northwestern parts of the mountain Dora Voda, in the surrounding of the village Zelezna Reka and on other places. The philits are rocks with grey up to black colour, and on several places they can be found as pale-brown and yellowish. They are made mostly by sericit or muscovite, quartz and chloride, and as side ingredients magnetite, turmaline, circon, pyrite and others can be found. Because of this structure they are usually less resistant on the process of erosion, but because of the great afforestation in that area they are protected from atmospheric influences i.e. drizzles.

Paleozoic magma rocks

The metarioliths can be found on the right valley side of the river Lakavica, between the villages Balin Dol and Belovishte, impacted between the metadiabasis and the green schist and the triyasks marble limestone. Also, breaches of metarioliths can be found east of village Trnovo where they

breach the triyasks limestone. Their colour can be white-grey, yellowish-green, white and pink. Under the influence of atmospheric drizzles, on the surface they mainly decompose, and in their foothill a karst deterus is mostly being created which is mixed with erysipelas. The metarioliths transgressively lie over the filitic schist or they appear as minor layers and lenses inside of them. These rocky masses are strongly wrinkled and as a result of that they are strongly broken. They are made of calcite grains as well as of muscovite and sercicitical rows which at certain places on the rocky masses give them a cipolinic look.

Complex of upper carbon

The rocky masses from this complex can be found on the Bistra mountain, on the watershed between the river basin of the river Lakavica and the basin of Leunovska Reka, as well as in the valley of the river Lakavica, on the swallow from the village Balin Dol to the foothill of the mountain Bukovic, on the swallow between the villages Belovishte-Lakavica-Srbinovo and Padalishte. This volcano-sediment series is made out of metadiabasis, metadiabasic tuffs, amphibolic-actinolitic, epidiotic, chloritic and other types of schist and rarely philits, carbonate schist-cipolinic and marble limestone can be found.

Metadiabasis and green schist (SepC3) appears in a wider part on the both sides of the river basin of the river Lakavica, especially in the lower part, in the northwest part of the mountain Dobra Voda and in the southwest part of the mountain Suva Gora, on the swallow from the town Gostivar towards the villages Belovishte, Lakavica, Trnovo, Srbinovo and Padalishte. This area has volcano-sediment origin. It is made of metadiabasis, metadiabasic tuffs, amphibolic-actinolitic, epidiotic, chloritic and other types of schist. Carbonate schist appear in a form of narrower parts or in a form of lenses. They have grey-greenish up to green colour. They are created as a result of underwater flood of lava, because of which they suffered a certain metamorphosis. Under the influence of these factors, the following associations of minerals were formed in them: actinolit, epidotic and albit, that replace the primal ingredients of the diabasis. Because of the internal change in the horizontal and vertical direction a separate distinction between these rocks is not possible.

The calcite grey white bank-massive marbles (MC3) according to their structure are massive up to bank and rarely they appear as tile rocks. Their colour is grey, grey-white and rarely they can be found as pink rocks. They

are tiny to big grain rocks which have granoblastic altorimophograinic or hetero grain structure. Basically they are made of calcite while other substances have insignificant participation. Under the influence of the strong tectonic movements they are cracked, and on the surface broken and on specific places even crushed and as a result of this in their foothill sipars or carbonate is found. Because of the influence of atmospheric drizzles they are strongly karsted on the surface. These rocky masses can be found mainly on the mountain Bukovic and in a form of smaller lenses can be found in the surrounding of the village Sretkovo and between the villages Dolna Gjonovica and Simnica on the left side of the basin.

Meteriolits (X). Besides the Paleozoic metamorphits with devonic and carbonic oldness in the basin of the river Lakavica, also appear magma rocks from the Paleozoic era. These kinds of rocks are the meteriolits. They can be found in this basin on the right valley side of the river Lakavica, on the swallow between the villages Balin Dol and Belovishte, impacted as breaches between the metadiabasis and the green schist and the triyasks marbles. Their colour is grey-white, yellow greenish white and pink.

Mesozoic sediments

The Mesozoic in the basin of the river Lakavica is presented by triyasks sediments and Jurassic drains or breach magma rocks. *Triyask sediments (T1,2)* in the basin of the river Lakavica can be found on the right side, on the mountain Suva Gora. They are presented with dolomitic marble, bituminotic marble and grey white marble limestone. This rocky masses lie in a form of bands over the older carbonic volcano sediments and meteriolitic breaches. At specific places the connection among them is tectonic. *The dolomitic marble (T2)* have white-grey colour, at specific places grey. They have tiny grain structure, saccharinic look and tiny to middle grain structure. They are made out of idiomorphic-roboidic grains of dolomite with mineral structure in which rarely side ingredients can be found. *Grey-white marble limestone (T2)* rocky masses can be found on the right side of the basin of the river Lakavica on the swallow between the villages Balin Dol-Kunovo-Trnovo. Mostly they lie over the dolomitic marble or over the bituminotic limestone. They have white-grey colour and at specific places they appear as white and pink. Basically they appear as banks, and rarely as tile and massive rocks. On the surface they are strongly broken and under the influence of the atmospheric drizzles they are considerably karstified.

Mesozoic magma rocks

On several places in the basin of the river Lakavica, magma rocks with Jurassic oldness can be noticed. They appear as drains or breaches in the Paleozoic schist. Among them, according to their importance the granodiorits and granites are spotted. *Granodiorits* are found on the left side of the basin of the river Lakavica, on the swallow between the villages Kunovi and Lakavica. These rocks breach the Paleozoic philatoids, permotriyask and triyask sediments. Under the effect of hydrothermal changes they are considerably changed. These rocky masses have grey-white to greenish colour and the green colour comes as a result of the intensive dinamomeramorph changes. On the surface they are solid and they have porfiroidic structure which is very often cataclysmic and sharpen. G*ranite* appears in a form of breaches in the volcano-sediment carbonate series, south of the village Trnovo and in the surrounding of the village Padalishte. Basically they are made out of feldspath, quartz and mica. They are quite solid rocks which are quite resistant on the process of erosion.

Complex of neogenic sediments

The neogenic sediments are spread in the lower part of the basin of the river Lakavica, in the surroundings of the village Lakavica. They have freshwater character and their origin is tightly connected with the forming of Poloshkoro Lake. The neogen in the basin of the river Lakavica is presented with upper Pliocene and quartern sediments. *The upper Pliocene sediments (P1 2,3)* are discovered in the south edge part of the Poloshka ravine in the surrounding of the villages Belovishte, Kunovo and Lakavica. In the other parts of the basin they are over covered with quartern sediments which main representatives are proluviyal and alluvial sediments. The Pliocene sediments in the upper parts of the profile are made out of jackal-clay-sandy material and in the lower parts out of sandy-clay material, then out of sandy clays and marls. In the lower parts the Pliocene sediments lie directly over the older crystal schist and marble, and from the upper part they are over covered with a thick layer of quartern sediments. These sediments basically have red-yellowish colour. The *quartern sediments* in the basin of the river Lakavica are spread on many places and they are represented by proluvium, alluvium, sipars etc. *The proluvium* (pr) can be found in many places in the basin of the river Lakavica, near the village Dolna Gjonovica, near the village Simnica, in the lower parts of the mountain Suva Gora and on other

places. The thickness of these layers is up to 10 meters. They are mostly presented by rough, weakly sorted classical material which is partly processed and partly unprocessed. *The hillside breches* (d) can be found in the foothill of the mountain Suva Gora, near the villages Belovishte, Balin Dol and on other places on the right side of the basin of the river Lakavica. They are made of unprocessed and slightly sorted pieces of marble limestone, which are cemented with carbonate material. Their thickness is estimated on approximately 50 meters. *The sipars* (s) can be found in the valley of the river Lakavica on the swallow from the Padalishka Reka up to Simnica's and Gjonovica's river flow in the river Lakavica. *The alluvium* (al) mostly is spread beside the bigger river flows for example as on the river Lakavica, downstream from village Srbinovo to the flow of the river Vardar and other places. The alluvial sediments are presented with rough classy unsorted material, which is made of jackals, sands, sandy clays etc.

Tectonics of the river basin

On the territory of the Republic of Macedonia there are four geotectonic units: Serbian-Macedonian massif, Vardarian area, Pelagonian Chorst anticlinorium and West-Macedonian area. The basin of the river Lakavica completely belongs to the West-Macedonian area.

The tectonic development of the basin is very complex and it is connected with two bigger orogenesis: herzinic and Alps. With the herzinic orogenesis the old Paleozoic creations were regionally metamorphosed and wrinkled in slightly synclinal and anticlinal structures. But, with the Alps orogenesis, which created a strong dinamometamorphism and intensive wrinkling of the terrain, the older herzinic structures mostly were processed. In the later phase of the Alps orogenesis which happened at the end of the late and the beginning of the middle Pliocene, the terrain of the basin of the river Lakavica was captured by intensive radial tectonics that formed the tectonic reefs: Polog, and Kicevo and Mavrovo reef. The later Paleozoic metamorphic rocks are strongly wrinkled. In the basin of the river Lakavica we can distinguish several bigger tectonic structures: the covers and the seedings with regional and local importance.

The seedings have different spread direction and mostly with direction northeast-southwest, north-south, west-east etc. They give a block look to the basin. Also, of special importance is the Lakavichko-Bukovichki

seeding, along this seeding the valley of the river Lakavica was built, as well as the East-Polog seeding which continues towards the Bukovic Mountain.

Hydrogeologic characteristics of the terrain

The rocky masses out of which the basin of the river Lakavica was created have different hydro geological characteristics and different hydro geological functions, so according to their hydro geological function they can be divided into: hydro geological conductors (collectors) and hydro geological isolators (reservoir area). According to the type of the porousness of the rocky masses they can be divided into: rocky masses with intergranular porousness, rocky masses with caveronous-crack porousness, rocky masses with spongy and caveronous porousness.

Hydro geological conductors (collectors). To this hydro geological group of rocky masses belong all the types of rocks that through their pore aggregates enable movement and accumulation of the free underground waters, which creates underground convexes. These types of rocky masses have collecting characteristics: the alluvial river sediments, proluviyal, deluvial, siparic and others that have intergranular porousness. Metadiabasis, grantodiorits, riolits, granite and crystal schist have a characteristic of crack porousness and the marble and the carbonate schist have karst-crack porousness. *Hydro geological isolators (reservoir areas).* This group of rocky masses contains all the types of rocks that through their pore aggregates do not enable or make a hard and insignificant movement of the underground waters, and because of this they are treated as conditionally waterproof environments. But, in local conditions, along some bigger and wider cracks or seedings, there can be a possible movement of the underground waters but with insignificant quantity. These types of rocky masses have hydro isolating characteristics: devonic filitic and green schist and all the types of magma rocks.

Hydro geological function of the seeding structures.

All the basin of the river Lakavica, especially its spring's part, have a big presence of seedings which appear as a result of the radial tectonic movements which happened in distant and recent geological past, during the time of the Alps orogenesis, and during these times the seeding took part in all the solid connected rocks and as result of that they give the terrain a look

like blocks. Along the seeding structures, the rocky masses are lifted up or dropped down and on some places dragged. As a result of that there is not only a complex geological structure of the terrain but also a hydro-geologic problem on this area.

Although there was no special investigation of the hydro-geological function of the seeding structures, it can be really significant from place to place. The seeding structures in some places can have a hydro-geologic conductor function (collector), in other places an isolatory barrier and in other places can cause breaking of the collectors i.e. they can broken into two or more independent collectors or vice-versa, they can be joined from two or more collector layers into one. Because of this it is important that the basin of the river Lakavica is investigated in a more serious and detailed way.

Conclusion

In the basin of the river Lakavica there are rocky masses of different structure, type and different hydro geological characteristics. Some of them have stronger and some weaker erodibility, which from its own side influence the pollution of the underground and of the surface waters of the basin. The crystal schist have stronger erodibility, and during intensive drizzles of rain or during the time when the snow melts, contribute to greater physical pollution or stir up of the river waters, especially the waters of the river Lakavica.

All solid connected rocky masses like limestone, magma etc. have weaker erodibility. Specially important here are the carbonate rocks for example dolomite marble and limestone, then triyask dolomitic marble and limestone, which because of their big karst under the influence of the tectonic movements are greatly cracked. At these rocks, because of the many cracks along the seeding structures, almost all the quantity of water infiltrates underground and in this way the pollution of the waters in the karst terrain is possible, especially in the spring waters. From the karst springs of the basin of the river Lakavica all the village settlements are water supplied, for example the village Lakavica and others.

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Project 6

Fuel as environmental pollutant in Tetovo

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Abstract

The rapid development of industry, communication, social-municipal housing activities, growth of population, as well as creating better conditions for a better and modern life, have led to increase of fossil fuel consumption. This has affected the growth of emission of harmful and dangerous materials in the air. Because of this, in parallel to urbanization and its development we need to pay attention to air pollution. In order to make an analysis of the air in Tetovo, we checked objects, energy and industrial supplies that consume fuel, such as housing objects, institutions and communication. The major part of production and industrial capacities belongs to the so-called "industrial zone" in the crossroad that links Gostivar and Skopje, where heavy vehicles move. In the other part of the town are dwellings, administrative and municipal and state institutions. Having in mind the fact that major air pollution is determined by the quantity, type and quality of fuel, we made some efforts to make figures more accurate and relevant.

Abstrakt

Zhvillimi i shpejtë dinamik i industrisë, komunikacionit, veprimtarive shoqërore–komunale banesore, rritja e numrit të popullsisë si dhe krijimi i kushteve më të mira për një jetë më të mirë dhe moderne, kanë ndikuar në rritjen e harxhimit të lëndeve djegëse fosile.Kjo ka ndikuar në rritjen e emisionit të materjeve të dëmshme dhe të rrezikshme në ajër. Për këtë arsye, paralelisht me urbanizmin dhe zhvillimin e saj duhet të mbahet llogari edhe për aerondotjen. Pranaj, që të bëhët një analizë e ndotjes së ajrit në Tetovë janë marë në shqyrtim objektet dhe paisjet energjetike dhe industriale në të cilat bëhet djegia e lëndës djegëse; objektet banesore , institucionet dhe komunikacioni. Pjesa më e madhe e kapaciteteve prodhuese dhe industriale gjenden në të ashtuquajturin ,,zonë industriale", në aksin rrugor që lidhë Shkupin dhe Gostivarin në të cilin lëvizin edhe automjetet e rënda. Në pjësën tjetër të qytetit gjenden vendbanimet, institucionet adminidtrative, komunale dhe shtetërore. Duke marë parasysh së në masë të madhe emisioni i ndotësve në ajër përcaktohet nga sasia, lloji dhe kualiteti i lëndës djegëse, janë bërë përpjekje që të dhënat të jenë sa më të sakta dhe relevante.

ВОВЕД

Брзиот индустриски развој, технолошкиот развој, демографскиот бум (порастот на населението), социјално-општинските активности, како и создавањето на подобри услови за подобар и помодерен живот, влијаеа на зголемената потрошувачка и злоупотреба на фосилните горива. Сево ова индицираше зголемена емисија на опасни и штетни по здравјето партикули во воздухот. Поради овој факт, и одејки паралелно со забрзаната урбанизација треба да се обрне големо внимание на загадувањетио на воздухот, пред се поради неговото штетно влијание по здравјето на човекот и целиот жив свет на планетата. Затоа, во насока да се направи анализа на квалитетот на воздухот во Тетово, ке земеме во предвид одредени објекти за анализа, енергетски и индустриски постројки кои ги користатво производството фосилните горива, како и некои градежни објекти и други институции.

Најголемиот дел од овие индустриски капациотети се дел од таканаречената "индустриска зона",која се наоѓа на патот со кој ги поврзува Скопје и Гостивар, каде се движат претежно тешките возила. Во другиот дел на градот се наоѓаат административните, општинските

и државните институции. Имајки го на ум фактот дека загадувањето на воздухот главно се детерминира преку квалитетот, типот и квантитетот на горивата, беа направени напори да овие одредувачки фактори бидат по релевантни, точни.

Introduction

Air is one of the major sources of human life. One can get an impression that this source-air is inexhaustible and everyone may take as much as he/she needs. Nevertheless, clean air nature belongs to past. Nowadays the development of industry, traffic, heating of apartments and institutions, burning of waste across the city, landfills of cities and industries, has resulted in the air pollution and in many harmful and dangerous phenomena to the living environment. Environmental pollution is harmful and dangerous in every regard. But its degree of danger is different and depends on its expansion and scope of activity. In this regard, the environmental pollution in Tetovo takes place in different ways starting from waste waters, solid waste disposal, to traffic and industry. However, we could freely say and ascertain that the water and soil pollution are localized and are of lower impact than air pollution caused by dust, gases released from industry, traffic, heating of apartments, institutions, decomposition and frequent burn of solid waste across the town. Therefore, we shall take and analyse air pollution considering it to be a more general, harmful and dangerous pollution to the environment which has a direct impact and harmful, dangerous effects on human health and life, herbs, animals and material goods.

Methods

Because industry is one of the biggest fuel consumers from which the dangerous gases (pollutants) in atmosphere are released as products from burning, we analyze the amount and type of fuel consumed in Tetovo for one year in all the branches and activities in which it is used based on the data on fuel consumed within a year. Data have been directly provided by the industrial enterprises, abovementioned activities, relevant institutions and literature. In this work we also analyze the amount and type of fuel which is used and consumed in one of the biggest combines in Tetovo and its surroundings, the metallurgic combine SILMAK. At the end, using the data

on the amount and type of fuel for 1995, we shall make a comparison of fuel which has been consumed in 1995 and 2005. We base our work on statistics, using the data of the Office of Statistics of the Republic of Macedonia, analysis, from which the amount of pollutants has been calculated and finally comparing the pollution of 1995 with that of 2005.

Amount and type of fuel consumed in Tetovo

Calculations of the pollutant emission is done based on the standard type of fuel given in table.1.

Table 1

Fuel	C %	H %	O %	N %	S %	Ash %	Moisture %	Heat.en KJ/kg
Coal	29.00	2.60	16.20	0.70	0.60	10.10	40.80	9562
Oil	86.03	13.04	0.05	0.49	0.01	0.02	0.00	45124
Crude oil	83.40	10.00	0.10	1.20	2.00	0.30	3.00	40363
Wood	30.70	3.70	27.00	0.10	0.00	1.5	37.00	9871

(from Srbinovski (1995))

Residential accommodation

The estimate of fuel for households is based on the statistical index. The average fuel consumption is used as an initial parameter across the houses (households) in the Republic of Macedonia and the number of households. According to statistical data of 2002 census, the city of Tetovo has 52,915 inhabitants and 12,920 families. This means that an average family in Tetovo has 4 members. In order to get more accurate data on the amount of fuel consumed by each family in the Republic of Macedonia, we shall take the average value over a period of seven years from 1983-1990. Table 2 shows the amount of fuel consumption per household.

Table 2

Fuel	Amount of fuel kg	Number of families	Fuel tonnes/year
Coal	33	12920	427
Wood	3025	12920	39083
Gas	3,130	12920	40
Oil	13	12920	165
Total			39715

(from Mile (1995))

Administrative institutions

In order to get more objective results for emission of pollutants in atmosphere, we have data on all government and municipal agencies based in Tetovo where fuel is burnt. No gas, coal or wood is used. The amount of oil burned is shown in Table 3.

Table 3

No	Company Administrative and educational institutions	Activity	Fuel Oil	tonnes/year crude oil
1	Municipality	Social	50	0
2	Court	Social	52	0
3	Police	Social	25	0
4	Hospital	Social	485	0
5	Cultural centre	Social	0	13
6	Stopanska Banka	Social	30	0
7	Employment Agency	Social	12	0
8	Health Fund	Social	15	0
9	Komuna projekt	Social	4	0
10	Interpromet	Social	0	0
11	Military barracks	Social	0	300
12	Post-office, Telecom	Social	49	0
13	Napredok	Printing house	12	0
14	High School	Social	35	0
15	Secondary School of Medicine	Social	44	0
16	Secondary School of Agriculture	Social	86	0
17	Secondary Textile School	Social	20	0
18	Secondary School of Economics	Social	20	0
19	State University of Tetovo	Social	46	0
20	SEE University	Social	150	0

21	Liria Primary School	Social	34	0
22	Istigball Primary School	Social	30	0
23	Goce Dellçev Primary school	Social	49	0
24	Migjeni Primary school	Social	45	0
25	Kikish Primary school	Social	19	0
26	Sh.F.Kiril dhe Metodi	Social	36	0
27	premises hotels and other facilities	Service-oriented hotel.	760	0
	Total		**2108**	**313**

Industry

From the data taken from these companies we see that the fuel in some of these companies is consumed only in the winter season in heating the facilities, whereas some companies use the fuel whole the year. Companies using fuel during the whole year are: the textile factory, AD "Milk Factory", Medical plastics plant, Zhito Pollog, Silmak, Etko, Renova Velur. Companies using fuel only for heating the facilities are: EMO and Shik Jellak. No gas is used.

Table 4

			Fuel				
No.	**Company**	**Activity**	**Oil**	**Coal**	**Crude oil**	**Wood**	**Total**
1	Teteks	textile industry *	139	37500	2044	0	39683
2	AD,, Dairy factory"	agricultural industry *	0	0	135	0	135
3	EMO	electric appliances	0	200	0	0	200
4	ETKO	ready made clothing *	160	0	0	0	160
5	Medical plastic plant	medical products *	50	0	120	0	170
6	Zhito Pollog	food processing *	200	0	0	0	200
7	Nemetali	Non-metal products *	28	0	0	0	28
8	Renova Velur	Leather *	0	0	350	0	350
9	Shik Jellak	Timber factory	0	0	0	495	495
	Total		**577**	**37700**	**2649**	**0**	41421
10	Silmak Jegunovc	Black metallurgy *	0	145444	0	8943	154387
	Total		**577**	**183144**	**2649**	**9438**	195808

fuel whole year

A further detailed study based on analysis by Sulejmani (2005) has been carried out of the materials used by the electro-metallurgical company Silmak based in Jegunovce, 15 km northeast of Tetovo, producing ferro-silicates, from which unfiltered emissions from chimneys 20-50 m high are blown by the wind towards the villages along the river Vardar and Dry Mountain, from Jegunovce up to Tetovo, throughout the year. Almost half the fuel consumed is white coal, the rest mainly lignite. The results are reported in the full paper.

Amount and type of fuel consumed in traffic

In order to estimate the air pollution from traffic in Tetovo we have to consider several parameters such as: amount of fuel consumed within a year, number and type of vehicles as well as their years of service. But being unable to provide the data from our institutions on the number, type and their years of service we have done the estimates based on the amount and type of fuel consumed by the gas stations in Tetovo, according to data from 2005. The results are shown in Table 5.

Table 5

No.	Name of enterprise	Fuel				
		Petrol		Oil		Gas
		Tonnes	Litres	Tonnes	Litres	Tonnes
1	Mak Petrol 1	2450	3500000	3290	4328947	0
2	Mak Petrol 2	1470	2100000	1277	1680263	0
3	Emka Petrol	630	900000	912	1200000	700
4	Euro Petrol	750	1071429	700	921053	900
5	Ata Petrol	600	857143	450	592105	0
6	Studjesa	776	1108090	1913	2517223	0
	Total	6676	9536662	8542	11239571	1600

\Conversion: 1 litre of oil = 0.76 kg; 1 litre of petrol = 0.70 kg

Overall consumption

Table 6

No	Name of activities	Fuel during 2005 tons/year							* %	** %
		Petrol	**Oil**	**Coal**	**Crude oil**	**Wood**	**Gas**	**Total**		
1	**Heating of apartments**	0	165	427	0	39083	40	**39715**	40	15.5
2	**Adm institut.**	0	2108	0	313	0	0	**2421**	2	0.9
3	**Industry**	0	577	37700	2649	495	0	**41421**	41	**16**
4	**Traffic**	6676	8542	0	0	0	1600	**16818**	17	6.6
Total I		**18068**		**38127**	**2962**	**39578**	**1640**	**100374**	100	**39**
	%	18		38	3	39	2		100	
5	**SILM. Combine II**	0		145444	0	8943	0	**154387**	**61**	**61**
I+II Total LD		**18068**		183571	2962	48521	1640	**254762**		
%		7.1		**72.1**	1.2	19	0.6		100	100

* *Fuel participation only in the city*
** *LD participation in the overall amount*

Amount of pollutants released from burning fuel

The amount of pollutants which is released from burning fuel has been calculated analytically, depending on the amount, type and quality of fuel. Detailed tables are given in the full report. In Table 7 the results are summarised in tonnes/year and in Table 8 by type of fuel.

Table 7

No.	Activities	SO_2 t/v	CO_2 t/v	NO_2 t/v	Ash and dust t/v	Total t/v	* %	* * %
1	Heat. of aprt	5	17596	12	849	18462	14	5
2	Heat. of aparts.	13	10684	2	48	10747	8	3
3	Industry	559	50217	13	1167	51956	40	14
4	Traffic	268	48231	14	36	48549	38	13
Total	**I**	845	126728	41	2100	129714	100	
%		0.65	97.7	0.03	1.62	100		
5	Silmak II	1694	236726	45	4477	242942	/	65
Total	**I+II**	2539	363454	86	6577	**372656**		
%		0.68	**97.5**	0.02	1.78	100		100

** Participation in % of pollutants according to the activities without the Silmak combine*

*** Participation in % of pollutants according to the activities with the Silmak combine*

Table 8

No I	Pollutants	SO_2		CO_2		NO_2		Ash and dust		Overall amoun	*	* *
	Fuel	**t/v**	**%**	**t/v**	**%**	**t/v**	**%**	**t/v**	**%**	**t/v**	**%**	**%**
1	**Oil**	269	32	56993	45	15	35	60	3	57337	44	15.3
2	**Coal***	458	54	40541	32	11	27.5	1102	52.4	42112	32.4	**11.3**
3	**Crude oil**	118	14	12135	9.5	2	5	60	3	12315	9.4	3.3
4	**Wood ****	0	0	16706	13.2	12	30	844	40	17563	14	**5**
5	**Gas**	0.2	0	332	0.3	1	2.5	34	1.6	367	0.2	0.1
I Total		845	100	126647	100	41	100	2100	100	129633	100	
%		0.65		97.7		0.03		1.62		100		
II					**SILMAK**							
1	**Coal***	1694	100	209656	89	42	93	4289	96	215681	89	**58**
2	**Wood ****	0	0	27070	11	3	7	188	4	27261	11	**7**

Total II	1694	100	236726	100	45	100	4477	100	242942	100	
Total I +II	2539		**363373**		85		6577		**372575**		
%	0.68		**97.5**		0.02		1.78		100		100

** Participation in % of pollutants according to the fuel without the Silmak combine .*
*** Participation in % of pollutants according to the fuel with the Silmak combine*

Comparison of fuel consumed in 1995 with 2005

In order to see how the fuel consumption changed throughout the years, we shall make a comparison and analysis of fuel in 1995 given by Srbinovski with fuel consumption in 2005, in tonnes per year, as in Table 9.

Table 9

Fuel	Oil t/y	Coal t/y	Wood t/y	Crude oil t/y	Gas t/y	Total t/y
Town 1995	2718	77885	30116	4305	35	115059
Silmak 1995	0	160000	30000	1423	0	191423
Total 1995	2718	237885	60116	5728	35	306482
%	0.8	77.6	19.6	1.9	0.1	100
Town 2005	18068	38127	39578	2961	1640	100374
Silmak 2005	0	145444	8943	0	0	154387
Total	18068	183571	48521	2961	1640	254761
%	7.1	**72.1**	19	1.2	0.6	100
Total LD 1995	2718	237885	60116	5728	35	**306482**
Total LD 2005	18068	183571	48521	2961	1640	**254761**
Change	15350	54314	11595	2767	1605	**51721**
Increase %	565	0	0	0	4586	0
Decrease %	0	22.8	19.3	48.2	0	**16.88**

In Tables 10 and 11 we show the emission of gases released from burning the fuel in 1995 and 2005 respectively.

Table 10

	SO_2 m^3	$CO_2 \cdot 10^3$ m^3	NO_2 m^3	Dust and ash	
City	387597	72959	17179	3162	
Silmak	691922	**105986**	27280	8163	
Total m^3	1079519	178945	44459	11325	
Total T	3084	351499	91	11325	365999

Table 11

	SO_2 m^3	$CO_2 \cdot 10^3$ m^3	NO_2 m^3	Dust ands ash	
Town	296529	64506	19853	2100	
Silmak	592998	**120515**	21677	4477	
Total m^3	889527	185021	41530	6577	
Total ton	2542	363434	85	6577	372638

These tables show that over the period 1995-2006 the amount of fuel used has decreased by 16.88%. As far as the type of fuel is concerned we can ascertain that both in 1995 and 2005 coal has been mostly consumed, 77.6% 1995 and 72.1% in 2005, and the consumption of wood is 19.6% in 1995 and 19% in 2005. There are some changes noted in the use of crude oil, gas and oil: the use of crude oil has decreased whereas the use of gas and oil has increased.

Comparing the fuel use of 1995 with 2005 we can ascertain that the reduction in the fuel consumption by 16.88% is as a result of the bankruptcy of many industrial facilities, reduction of their capacities, such as the case with the textile combine, the use of other heating fuel, and use of electricity.

Although fuel use decreased by 16.88% we see that the amount of released pollutants is has increased by 1.8%. This is as a result increase in CO_2 released from oil and use of more qualitative fuel such as coal and wood (with a higher coal percentage) in the Silmak combine.

Conclusion

From the data and analyses of the amount and type of fuel we can conclude that fuel is used (consumed) during the whole year with a small difference between the winter and summer. 83% is used during the whole year by

industry and traffic. Therefore we can ascertain that industry is the biggest consumer of fuel and at the same time the biggest pollutant of the environment and atmosphere from the emission of gas and dust. Combines which are major fuel consumers have no filtration equipment installed or they are out of service. Therefore they are the major air pollutants in Tetovo. The fuel mostly consumed in Tetovo is coal participating with 72.1% and wood with 19%. Their major consumers are the industry and households.The reduction in the amount of fuel from 1995 until 2005 is not as a result of its substitution with another source of energy, but as a result of decrease in the production capacities and the bankruptcy of some industrial companies. From 1995 until 2005 we have a decrease in consuming crude oil and coal but increase in oil and gas which are used for heating and traffic.

Finally we can ascertain that the major pollutants of environment and atmosphere are still industry and traffic. This matter requires special attention.

Some of the measures that would help improve, prevent and decrease the pollution are: (i) installation of equipment for gas filtration and dust prevention; (ii) changes in the technical and technological processes; (iii) preliminary treatment of fuel (concretely coal) by disposing of the hazardous elements such as sulphur; (iv) substitution of fuel with some other more qualitative fuel; (v) creating green areas between the industrial area and living quarters; (vi) protection of living quarters from the traffic inside the city; (vii) construction of parking lots in the downtown area; (viii) use of vehicles with catalyzers as well as use of urban buses with gas; (ix) control and prevention of waste burning and landfills in the town.

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